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June 25, 2007

Confidential
C/025/0005

Mr. Joe Helfrich
Utah Division of Oil, Gas and Mining
P.O. Box 145801
Salt Lake City, Utah 84114-5801

Dear Mr. Helfrich,

Enclosed please find two copies of the revised data recovery plan entitled "Data Recovery Plan and Research Design for Sites 42Ka2042, 42Ka2068, 42Ka6104, 42Ka6105, 42Ka6106, 42Ka6107, and 42Ka6108, Kane County, Utah." The mitigation plan lays out the research design and data recovery program for the seven previously recorded sites that have been deemed eligible for inclusion in the National Register of Historic Places (NRHP) and which can not be avoided by the current undertaking.

If you have any questions concerning this project, please call me.

Sincerely,

Keith R. Montgomery
Principal Investigator

JUN 2 9 2007

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Refer to Record No 0003 Date 6/29/07
In C/025/005, 2007, Incoming
For additional information

DATA RECOVERY PLAN AND RESEARCH DESIGN FOR SITES 42KA2042, 42KA2068, 42KA6104, 42KA6105, 42KA6106, 42KA6107, AND 42KA6108 KANE COUNTY, UTAH

Patricia Stavish

DATA RECOVERY PLAN AND RESEARCH DESIGN FOR SITES 42KA2042, 42KA2068, 42KA6104, 42KA6105, 42KA6106, 42KA6107, AND 42KA6108 KANE COUNTY, UTAH

Prepared By:

Patricia Stavish

Prepared For:

State of Utah Public Lands Policy Coordination Office
Salt Lake City, Utah

and

Division of Oil, Gas, and Mining
Salt Lake City, Utah

Prepared Under Contract With:

Alton Coal Development
615 North 400 East
Huntington, Utah 84528

Submitted By:

Keith R. Montgomery, Principal Investigator
Montgomery Archaeological Consultants
P.O. Box 219
Moab, Utah 84532

June 22, 2007

MOAC REPORT NO. 07-136

United States Department of Interior (FLPMA)
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INTRODUCTION

In 2005, Montgomery Archaeological Consultants, Inc. (MOAC) conducted a cultural resource inventory of the proposed Alton Coal Development's Coal Hollow (Sink Valley-Alton Amphitheater) project area (Stavish 2006). This survey resulted in the documentation of one previously recorded historic/prehistoric site (42Ka2068), five previously recorded prehistoric sites (42Ka1313, 42Ka2041, 42Ka2042, 42Ka2043, and 42Ka2044), and nine new prehistoric sites (42Ka6104, 42Ka6105, 42Ka6106, 42Ka6107, 42Ka6108, 42Ka6109, 42Ka6110, 42Ka6124, and 42Ka6126). Of the 15 documented sites, one site is not eligible to the NRHP (42Ka2124) and seven of the sites will be avoided by the undertaking (42Ka1313, 42Ka2041, 42Ka2043, 42Ka2044, 42Ka6109, 42Ka6110, and 42Ka6126). The remaining sites (42Ka2042, 42Ka2068, 42Ka6104, 42Ka6105, 42Ka6106, 42Ka6107, and 42Ka6108) cannot be avoided by the undertaking and are all eligible to the NRHP under Criterion D.

Briefly, the sites included in the data recovery plan include a prehistoric temporary camp of unknown cultural affiliation (42Ka2042), a historic homestead and prehistoric lithic scatter (42Ka2068), a lithic scatter of Archaic temporal affiliation (42Ka6104), a lithic scatter of protohistoric/contact period temporal affiliation (42Ka6105), two lithic scatters of unknown cultural or temporal affiliation (42Ka6106 and 42Ka6107), and a lithic scatter of Early Archaic temporal affiliation (42Ka6108). These sites are situated in the western portion of Sink Valley within the Alton Amphitheater and many of the sites exhibit integrity, spatial patterning, and good potential for intact subsurface cultural remains. These sites are recommended eligible to the NRHP under Criterion D, as the sites are likely to yield information important to the history and prehistory of the area and could address such research topics as site function, chronology, subsistence, material culture, and spatial organization.

The purpose of this data recovery plan is threefold. First, the data recovery plan serves as a research design to direct the archaeological investigations. This includes the identification and development of relevant research questions and examining the methods and techniques necessary to address these questions. Second, the plan outlines the methods and techniques that will be used during mitigation, in the laboratory, and during analysis of the data collected. Third, the data recovery plan addresses public participation, curation, and dissemination parameters for all phases of the project. Additionally, data recovery at these seven sites, as proposed in this research design, may provide information that will allow for better, more informed management of surrounding cultural resources for future undertakings in the Alton Amphitheater and Sink Valley regions.

ENVIRONMENTAL CONTEXT

The study area lies within the Grand Staircase Section physiographic subdivision of the Colorado Plateau (Stokes 1986). This area is characterized by a series of cliffs and terraces that rise from the Grand Canyon in Arizona to the summit of the High Plateaus in Utah. This section is bounded on the east by the East Kaibab Monocline, on the west by the Hurricane Fault, on the north by the edges of the various high plateaus, and on the south by the Grand Canyon of Arizona. Harder rock layers create cliffs and accompanying benches and tablelands, whereas the softer rock units have eroded into slopes and badlands. Specifically, the project area is located along the western edge of the Paunsaugunt Plateau. The Alton Coal Field is comprised of relatively horizontal bedrock units of Mesozoic age (see Stavish 2007:Appendix B). Within portions of the project area, bedrock units are exposed as low hills and along the incised drainage of Kanab Creek.

From the oldest to youngest: the Winsor member of the Carmel formation (Jurassic), the Dakota formation (Cretaceous), and the Tropic shale (Cretaceous). The horizontal deposition of the geologic formations coupled with the impact of water and wind erosion has reduced much of the area to flat ridges and benches, which are dissected by long alluvial drainages and tributaries. Drainages often widen to form meadows, such as Sink Valley and the Alton Amphitheater. Alluvial valley fill, derived from weathered bedrock, is extensive throughout the project area along the broad, open areas of cultivation and valley floor. Characteristics of the alluvial valley fill include the location of low, relatively level areas, often used for cultivation, and incised arroyos and drainages. According to Lamm (see Stavish 2007:Appendix B), total depth of the alluvial valley fill is not known and likely varies across the project area. Soils in the drainages have some agricultural potential as a result of their sand, gravel and silt composition and the presence of limestone and arkosic minerals (Gregory 1951:12). Today less than 2% of the Alton Coal project area is under cultivation and products consist primarily of alfalfa, potatoes, and cold weather vegetables, which require different growing conditions than the prehistoric corn-based agriculture (Halbirt and Gualtieri 1981:6). Major drainages in the project area are Kanab Creek, Sink Hole Valley Wash, and Lower Robinson Creek. Kanab Creek flows from north to south through the project area forming an incised canyon, and eventually empties into the Colorado River by way of the Virgin River. In addition, water resources are manifested as geologic aquifers or springs. Most of the springs are perennial and are derived from the Tropic Shale formation.

Elevation in the project area ranges from 6800 ft (2079 m) to 7200 ft (2202 m). Climatic patterns are based on a 59 year record (1915 to 1974) from the Alton, Utah, weather station (Halbirt and Gualtieri 1981:8). The average monthly temperatures are generally mild and follow a modal distribution with a low of 26°F during January and a high of 65°F during July. The number of consecutive frost-free days average between 84 to 104 days (Gregory and Moore 1931). This period is shorter than the necessary 100 to 120 frost-free days required to mature modern hybrid corn, and more time is needed under dry conditions (Crosswhite 1981). The vegetation over most of the study area is a pinyon-juniper and sagebrush community. Pinyon-juniper with oakbrush associations occur on the tops and slopes of ridges, while a sagebrush community exists within alluvial flood plains, draws, and meadows. Other plant species which may have been utilized by ethnographic and prehistoric groups in the area include: barberry, canyon grape, cattail, currant, goosefoot, onion, prickly pear cactus, sedge, squawbush, sunflower, and yucca (Ibid:10). Modern impacts of the landscape include ranching, agriculture, coal mining, and roads.

ARCHAEOLOGICAL BACKGROUND

Previous Archaeological Work

A record search for previous projects and cultural resources was conducted at the Utah State Historic Preservation Office, Salt Lake City on March 25, 2005 by Ms. Marty Thomas. Intensive cultural resource investigations have taken place in the area since the 1980s; however, numerous archaeological sites have been recorded since the 1970s. The majority of the eleven identified inventories were conducted by the Museum of Northern Arizona or Bureau of Land Management and are mostly related to proposed mining activities.

In 1974, the Museum of Northern Arizona (MNA) performed clearance of 48 drilling locations and access routes on the Skutumpah Terrace in Kane County; 19 drilling locations and access routes in the Alton Amphitheater in Kane County; and four meteorological tower sites in Kane County (Davidson, Foster and Ackerly 1974; Project No. U-74-NI-0037bps). Thirty-six archaeological sites were documented during the investigations. None of the sites are located in the project area.

In 1979-1980, MNA conducted inventories for Utah International, Inc.'s coal mining lease area situated on the Skutumpah Terrace and Alton Amphitheater (Halbirt and Gualtieri 1981; Project No. U-81-NI-0254b and U-80-NM-007). The four surveyed parcels were designated Alton East and Alton West, the coal preparation plant site, and major road routes. A total of 107 archaeological sites, most of which were of prehistoric affiliation, were documented dating from the Archaic to Late Prehistoric. None of the sites occur within the project boundary.

In 1980, the Bureau of Land Management (BLM) Kanab Field Office performed a Class III inventory of Engineers International, Inc. seismic testing areas (McFadden 1980; Project No. U-80-BL-0162b). No cultural resources were located in the project area. The BLM performed a cultural resource inventory in 1981 of a tract allotment for Heaton Brothers (McFadden 1981; Project No. U-81-BL-0230b). No archaeological sites were documented during the project. The Cone allotment chaining area was surveyed by the BLM in 1982, resulting in a finding of no cultural resources (McFadden 1982; Project No. U-82-BL-0178b).

In 1984, the BLM surveyed the Syler Knoll chaining area for cultural resources (McFadden 1984; Project No. U-84-BL-0679b). Previously recorded site 42Ka2045, a large lithic scatter containing diagnostic artifacts, was located within the project area. Because 42Ka2045 was previously evaluated as not significant (for eligibility to the NRHP), clearance was recommended for the chaining activities.

In 1986, MNA performed cultural resource inventories of 43 drill locations and access roads within the Alton Coal Field for Utah International, Inc. (Weaver 1986; Project No. U-86-NI-0279bp). Two new archaeological sites, located outside of the current project area, were documented. Also in 1986, MNA performed survey and monitoring of nine test pit locations and access routes for Utah International, Inc. (Weaver and Hurley 1986; Project No. U-86-NI-0864b). No new cultural resources were documented.

In 1986, MNA returned to the Alton Coal Leasehold to survey another 12,500 acres, resulting in the documentation of 103 additional sites, none of which occur in the present project area (Keller 1987).

In 1987, the Museum of Northern Arizona (MNA) surveyed 22 auger borings and 27 backhoe test pits for Utah International, Inc. (Weaver and Hurley 1987; Project No. U-87-NI-0856b). In 1993 and 1994, Nielson Consulting Group and Timpanogos Research Associates performed cultural resource inventories and site evaluations of several abandoned mines in central and southern Utah (Hughes, Nielson, and Sulz 1994; Project No. U-93-NP-0712). None of the mines are located in the current project area.

In June and July 2005, MOAC conducted a cultural and fossil resource inventory of Alton Coal Development's project area in the Alton Amphitheater, south of the town of Alton, Utah (Stavish 2007). The inventory resulted in the documentation of 31 previously recorded archaeological sites and 60 new archaeological sites. The previously recorded archaeological sites include one historic site (Alton Cemetery); three multi-component prehistoric/historic sites; and 27 prehistoric sites that consist of temporary camps, artifact scatters, and lithic scatters. The new archaeological sites include two historic sites (a corral and a bridge); two multi-component prehistoric/historic sites; and 56 prehistoric sites that consist of temporary camps, artifact scatters, and lithic scatters. The inventory also resulted in the documentation of 30 new paleontological localities and three previously documented paleontological localities (Stavish 2007). In August 2005, MOAC completed a survey of six coal seam drill sites for Alton Coal Development; no cultural resources were found (Thornton and Montgomery 2005).

Cultural-Historical Overview

Human occupation in the region represents the Paleoindian, Archaic, Formative, Protohistoric, and Historic cultural stages. The first Native American occupation of the general study area probably occurred during the Paleoindian stage at the late glacial Pleistocene-Holocene boundary (ca. 11,500 B.P. - 9000 B.P.). Early Paleoindian artifact assemblages are typified by large, lanceolate projectile points, spurred end scrapers, gravers and borers, and crescents (Frison 1978:78), indicating the exploitation of megafaunal and floral resources. On the basis of projectile point typologies and subsistence strategies, the early portion of the Paleoindian stage is commonly divided into two cultural complexes referred to as the Clovis (ca. 11,500 - 11,000 B.P.), and the Folsom (ca. 11,000 - 10,000 B.P.). Aikens and Madsen (1986) postulate that Paleoindian people migrated into the eastern portion of the Great Basin following the recession of Lake Bonneville (10,500 B.P.). Several surface fluted projectile points have been reported from Garfield County (Copeland and Fike 1988) and northeastern Arizona (Geib 1995). Late Paleoindian or Plano projectile points have been found on the Kaiparowits Plateau and classified as large stemmed or concave base points (Geib, Collette and Spurr 2001:191-192).

The Archaic stage (7800 - 500 B.C.) is generally viewed as a hunting-gathering lifeway that is represented by subsistence practices more labor-intensive than those of Paleoindians with a greater number of smaller animal and plant species being intensively exploited. Several cultural sequences for the Archaic stage are proposed on the basis of regional differences. Jennings (1978) provides a concept of the western Archaic, or Desert Culture, based on diverse resource exploitation, diagnostic artifacts including cordage and basketry, and artifactual variability in various regions such as the California-Nevada axis and Utah-Oregon axis. Matson (1991) presents a four-period sequence model incorporating data from the Greater Southwest: Early (7800 - 4000 B.C.), Middle (4000 - 2000 B.C.), Late (2000 - 1000 B.C.), and Terminal (1000 B.C. to roughly A.D. 700).

South of the study area, the Early Archaic period is labeled the Desha Complex known for its crudely made, shallow, side-notched lanceolate points. In the Glen Canyon region excavations from Sand Dune and Dust Devil Cave provide a radiocarbon date of 5050 to 6050 B.C. (Lindsay et al. 1968). About a dozen projectile points were recovered from the lower layer in Sand Dune Cave including Pinto Series, Jay, and varieties of side-notched points (later classified as Sand Dune Side-notched) (Matson 1991:147). Faunal remains recovered from the Desha Complex include those of mountain sheep, cottontail, pack rat, and lesser numbers of jackrabbit, gopher, squirrels, skunk, and bison (one bone). At Dust Devil Cave, the earliest Archaic component (Stratum IV) provided a date from a yucca-lined pit of ca. 8793 B.C. along with an abundance of prickly pear cactus (*Opuntia*) extracted from human feces (Ambler 1996:42). Significant materials recovered from this cave included 25 Archaic sandals, classified into three basic types; open-twined, fine warp-faced, and coarse warp-faced (Ibid 44). On the northern Colorado Plateau the earliest Archaic component is dated at Cowboy Cave (42Wn420) between 7430 and 7100 B.C. although no artifacts were found in this stratum (Schroedl and Coulam 1994:11). The upper Early Archaic component (Stratum III 5250 - 4350 B.C.), however, contained 11 projectile points (Pinto, Northern Side-notched, and Elko Corner-notched), faunal remains (cottontails, jackrabbits, porcupine, and *Canis* sp.), and floral remains (sunflower, sand dropseed, chenopods, cactus, juniper and bugseed) (Jennings 1980). The most significant features from Stratum III were a number of depressions referred to as "scooped out troughs" by Jennings (1975:9), more recently redefined by Schroedl and Coulam (1994:6-7) as pitstructures which were repeatedly cleaned out and reoccupied during the Early Archaic. In the Alton West Coal leasehold previous investigations have documented several Early Archaic projectile points types (Pinto Series, Humboldt, and Northern Side-notched) from sites which include later Formative and Late Prehistoric temporal components (e.g. 42Ka2045 and 42Ka2056) (Halbirt and Gualtieri 1981).

During the Middle Archaic period (4000 - 2000 B.C.) there was a decrease in the occupation of the Colorado Plateau, presumably caused by the Altithermal climate, which may have been a two drought event (Matson 1991:165-166). Many of the previously mentioned sites (Dust Devil Cave and Cowboy Cave) exhibit a reduced intensity of occupation during the Middle Archaic period. Recent radiocarbon data from the Glen Canyon region are filling the Middle Archaic gap (e.g. 1,000 years) as proposed by Berry and Berry (1986) for the Colorado Plateau indicating that the hunter-gatherers of the area may have not completely abandoned the area 6,000 years ago (Geib 1996:32). Middle Archaic settlement patterns most likely reflect the response to a probable protracted drought by populations shifting residential camps to water-rich lowlands and especially higher elevation settings (above 8,000 ft). Common projectile points at Middle Archaic sites are Sudden Side-notched, San Rafael Side-notched, Hawken Side-notched and Elko Series. Previous investigations in the Alton West Coal leasehold have identified such point types as Sudden Side-notched from sites which include other Archaic periods and later temporal components which appear to represent residential camps and processing camps (Halbirt and Gualtieri 1981).

The Late Archaic period began around 4,000 years ago and corresponds to a noticeable increase in radiocarbon dates in the region and is temporally correlated with an increase of effective moisture what is termed as the sub-boreal interval (Berry and Berry 1986). This period is marked by a heavy reoccupation of Cowboy Cave starting at about 1750 B.C. and is characterized by the inhabitants engaging in broad-scale hunting and gathering with an increased emphasis on mountain sheep and chenopods/amaranths (Matson 1991:171). Gypsum projectile points comprised approximately 30 percent of the total identifiable collection from Cowboy and adjacent Walters Cave (Jennings 1980:36). These stemmed points are among the most common type of point found in southeastern Utah and appeared on the northern Colorado Plateau sometime after 2550 B.C.

(Holmer 1986:105). Split-twig figurines are another important diagnostic of the Late Archaic period, best known from Cowboy Cave, but occur over a broad territory centered on the Colorado River and it tributaries. Further south in the Glen Canyon region, Late Archaic occupations are less represented, although a few Gypsum points were recovered from Dust Devil Cave (Geib and Ambler 1991). On the Kaiparowits Plateau, Late Archaic sites are represented primarily by residential camps situated in the higher elevations with access to ample water, fuel wood, large and small game, and plant resource diversity whereas the limited activity camps and reduction loci are prevalent in the lower elevations that contained a greater abundance of economic grasses (Geib, Collette and Spurr 2001:367). Investigations at the Arroyo Site (42Ka3976) situated in The Grand Staircase-Escalante National Monument revealed a potential pitstructure exposed in a trench below a Formative horizon and dated circa 1850 B.C. may attest to a semi-permanent occupation of the floodplain environment (McFadden 2000:15). In the Alton West Coal leasehold several Late Archaic Gypsum projectile were recorded at open sites with other older and more recent prehistoric temporal components (42Ka2047 and 42Ka2059) (Halbirt and Gualtieri 1981).

The Terminal Archaic period (1000 B.C. to roughly A.D. 700) is marked on the northern Colorado Plateau by the presence of arrow points and shafts along with the introduction of corn. The Archaic-Formative transition at Cowboy Cave is found in two separate episodes of occupation beginning about A.D. 100 during a period of high effective moisture (Schroedl and Coulam (1994:23). This relatively intense occupation (Stratum Vb) appeared to have represented a late summer/early fall seed processing locale based on the coprolite evidence (Hogan 1980). A corn cache as well as corn kernels were found in this horizon revealing that the pre-Formative occupants were growing this domesticate, although the extent of agricultural dependency is unknown. It is well established that corn dates to at least 1200 B.C. across much of the southern portion of the Colorado Plateau with later dates derived from sites further north (Geib 1996:54). Even if the populations in the study area were not actively involved with farming by around the Christian era, they were likely in contact with farmers or were a least experiencing changes resulting from the presence of nearby farmers. At Hog Canyon Dune (42Ka2574), located at the junction of Hog and Kanab creeks about two miles north of Kanab, charred corn kernels were recovered from a pitstructure in association with a hearth and a burial yielding two dates: 910 - 390 B.C. and A.D. 60-640 (Janetski 1993:229). The dating of bow and arrow introduction to the eastern Great Basin and Utah has been an issue of continuing debate. Past evidence from the lithic technologies between the terminal Archaic Proto-Fremont and Basketmaker II populations indicates that by ca. A.D. 100 the bow and arrow was employed by the ancestral Fremont, while the ancestral Anasazi continued to employ the atlatl. In the northern portion of the region, at Cowboy Cave, arrow points come from preceramic Stratum V deposited about A.D. 100-600 (Schroedl and Coulam 1994). To the south, the Sunny Beaches site (42Ka2751) in the Glen Canyon Recreational Area is somewhat of an anomaly. A number of Rose Spring Corner-notched points, which are accepted markers of bow and arrow technology dated earlier (e.g. around A.D. 100) than the established chronology for Basketmaker II aceramic occupations. In the Alton Coal Leasehold previous inventories have documented Rose Spring Corner-notched arrow points from several sites. At site 42Ka2056 both Early Archaic Pinto Series points and Rose Spring Corner-notched points were found, but in two separate lithic assemblage loci (Halbirt and Gualtieri 1981:85).

The Formative stage began about A.D. 500 when ceramics were generally used on the Colorado Plateau, and continued until A.D. 1300, with the Anasazi abandonment of Four Corners region. Within the region, this stage encompasses two different cultures: the Anasazi (Puebloan) and the Fremont. The project area is within the occupation zone of the Anasazi which is divided into two recognizable branches: The Virgin Anasazi, primarily occupying the Arizona Strip,

southwestern Utah, and southernmost Nevada; and the Kayenta Anasazi, occupying a large portion of northern Arizona and far southeastern Utah. The Fremont are considered a separate entity, found primarily at sites in Utah north of the Anasazi region. Artifactual evidence in the study area indicates primarily a Virgin Anasazi cultural tradition, although both Kayenta Anasazi and Fremont ceramic types have been identified.

The Virgin Anasazi occupied the area from Basketmaker II through early Pueblo III times, and apparently adapted horticultural practices to a variety of environmental conditions (Thompson and Thompson 1978; Walling and Thompson 1988). Investigations in the Grand Staircase area east of Kanab Creek indicates it was occupied continuously from at least Basketmaker III times (ca. A.D. 300) through late Pueblo II (ca. A.D. 1200). Virgin Anasazi residential units are characterized by an architectural sequence from pithouse residences with separate cist storage facilities, through intermediate stages of room block development, and eventually to substantial surface masonry pueblos incorporating both storage and habitation functions (Talbot 1990). According to McFadden (1996:24) the quantity of storage space per residential unit did not vary significantly over time indicative of a continuity of subsistence practices.

In the Grand Staircase region Virgin Anasazi sites located immediately adjacent to cultivable fields were fully residential with large storage capacities (Ibid 7). Furthermore residential mobility may have been part of an adaptive strategy that allowed the Virgin Anasazi to engage in agriculture in an environment in which a variety of short-term environmental fluctuations needed to be accommodated. In contrast the Kolob/Skutumpah Terrace area where the present study area resides (above 6,400 ft) is characterized by a short growing season (less than 120 days at Alton), hence prehistoric agricultural potential was risky. Several studies in this area (Christensen et al. 1983; Halbirt and Gualtieri 1981; Keller 1987:87) indicated that the vast majority of the prehistoric sites are limited activity sites or camps related to hunting and gathering behavior. Documented sites reflect Archaic, Virgin or Western Anasazi, and Southern Paiute groups which engaged in hunting and gathering activities most likely on a seasonal basis (Keller 1987). For the entire Alton Coal leasehold, Keller (Ibid.:87) estimates that 23 percent of the total sites date from Basketmaker III to Pueblo II. Data compiled by McFadden (1996:17) from this area, as well as the Grand Staircase and Upper Virgin River suggests that Virgin Anasazi residential sites are virtually always associated with agricultural potential, while hunting/gathering sites are more common in the elevated zone where agriculture is not feasible. Ceramic types identified in the Alton Coal leasehold are dominated by mainly Virgin Anasazi North Creek Gray, North Creek Corrugated, Shinarump Brown, and St George Black-on-Gray. To a lesser extent Kayenta Anasazi (Tusayan Black-on-Gray) and Fremont Great Salt Lake Gray have been reported in the area adjacent to Kanab Creek (Halbirt and Gualtieri 1981:35).

In the Grand Staircase physiographic section the adaptive strategy of the Virgin Anasazi is summarized by McFadden (1996:30) as an occupation of multiple "homesteads" located in a variety of different agricultural niches, each with different characteristics but all suitable for agriculture. Furthermore, shifts in residence would occur periodically in response to short term climatic fluctuations, but also as a result of local environmental deterioration. A comparison of site types from the lower elevation study areas and the Kolob and Skutumpah Terrace area suggests that given frequent residential moves, the farmsteads themselves could have served as base camp/processing stations with this upland functioning as a hunting-gathering component.

Protohistoric occupation of the project area is attributed to the Southern Paiute, members of the Numic population. Several models address the migration of Numic populations to the Great Basin. Some theorize that Numic expansion from the southwestern Great Basin eastward occurred approximately 1,000 years ago. Other models view the expansion taking place several thousand years ago. On the basis of the co-occurrence of Southern Paiute and Virgin Anasazi ceramics in stratigraphic context it is theorized that entry into the southwestern Utah area by Numic speakers occurred during the late occupational period of the Virgin Anasazi (Westfall, Davis, and Blinman 1987). Fowler (1994) compares the material culture of the Southern Paiute to that of the Virgin Anasazi, noting similarities such as clay figurine styles, certain features of coiled basketry, and one type of sandal, and concludes that these similarities suggest interaction between the groups. Besides pottery or perishable materials, the other common diagnostic is the Desert Side-notched projectile point. Although Desert Side-notched points should be considered horizon marker rather than ethnic markers, Southern Paiute use of the study area is well documented (Kelley 1964), and appeared to have constituted the primary post-A.D. 1300 indigenous occupation. Cottonwood Triangular points may not be useful diagnostics of Numic occupations if they are unfinished items broken in production; such tools might have been intended as Desert Side-notched points or Bull Creek points or some other arrow point type (Geib, Collette and Spurr 2001:392). Southern Paiute Brown Ware found in southwest Utah is characterized as conical-bottomed vessels exhibiting undulating surfaces on their thick walls. Decoration is limited to some surface incising, corrugation or fingernail impressions, and/or clapboarding of coils; the former often over the entire surface of the vessel (Baldwin 1950). Temper tends to be visible and coarse and fall into two types for the area: 1) abundant very fine rounded to subangular particles that are generally clear and appear to be frosted suggesting that they originate from eolian and alluvial deposits; 2) large angular to subangular particles most of which are white and very fine grained as if derived from a crushed quartzite or other aphanitic particles (Westfall, Davis, and Blinman 1987:70).

The Southern Paiute were hunter-gatherers and part-time horticulturists, with domesticates playing a minor role in their subsistence strategy (Fowler and Fowler 1971, 1981; Steward 1938). This cultural tradition is characterized by the use of rockshelters, and open camp sites containing wickiup dwellings, rock-filled roasting pits, fire hearths, conical-bottomed brownware ceramics, some decorated with fingernail incisions, rabbit fur blankets, basketry hats and containers, digging sticks, milling stones, and stone tools (Euler 1966; Westfall, Davis, and Blinman 1987). Social organization revolved around bands of multiple family units, cooperating and joining forces when necessary to ensure the survival of the community (Steward 1938). At least 16 major bands, or 35 smaller groups, have been identified in Utah.

The area adjacent to the present town of Alton was the summer home of one of the seven socio-economic groups that comprised the Kaibab Band of the Southern Paiute (Kelley 1964). The organization of these groups was largely economic in character, however, some attention was allotted to social residence. It appears that the group inhabiting the Alton area was a small patrilocal aggregate. Evidence exists that other groups visited the area occasionally to gather seeds and berries yet there seems to have been minimal economic cooperation between groups (Ibid.). The Alton group was controlled by a chief who directed the seasonal movements of camps, and who was in most instances in charge of deer hunting (Ibid 27). According to Kelley (Ibid 6), campsite location was determined by the presence of springs which fell under the jurisdiction of the local economic group. Subsistence activities varied according to seasonality, with the occupants of a spring "....tending to share the same seasonal cycle" (Ibid 8). During the winter, the group resided in Kanab Canyon were camps were semi-permanent in the sense that the occupants returned to them following hunting and foraging trips. Resources utilized during this period included

seeds and rabbits, the latter hunted in large scale drives consisting of perhaps 25 individuals from different households (Ibid 24). Periodically, deer and pinyon nut forays were also conducted along the top of the Vermillion cliffs. When snows receded in the spring, the group moved north to the Alton area and subsisted until summer on stores of food previously cached in caves (Ibid 16). The group remained in Alton for most of the summer collecting a wide variety of seeds and berries as well as hunting deer, marmot, and rabbit (Halbirt and Gualtieri 1981:15). At some point during this period the group returned briefly to the Kanab area to gather seeds and cached them for the succeeding winter occupation (Kelly 1964:16). Deer hunting and the gathering of "plateau" seeds was emphasized during the late summer to fall months. It is during this period that deer begin to congregate in small migratory groups.

Navajos occupied areas of the Skutumpah Terrace during the post World War II period (about 1945 to 1970) while cutting and installing cedar fences for local ranchers (Halbirt and Gualtieri 1981:56). Physical remains from the Navajo occupation primarily east of the project area fall into one of the four following categories: 1) forked-stick hogans composed of interlocking poles and a corbelled roof entrance; 2) palisade hogan composed of a corbelled roof supported by four corner posts and a seriers of stringers which lean against the roof; 3) brush hogan roughly square in plan view and partially supported by two living pinyon trees which provided the superstructure firm support; 4) sweat lodge consisting of three interlocking poles with stringers leaning against the frame and packed with mud daub (Bradley 1999:56).

The first documented entry of European Americans into Kane County was the expedition of Fathers Francisco Atanasio Dominguez and Silvestre Velez de Escalante in the autumn of 1776 to establish an overland route between settlements in Santa Fe and Los Angeles. Because of a snowstorm near Milford, the expedition halted the attempt to reach California, and instead followed a route to the southeast to return to Santa Fe. Along this route they named Sulphur Creek (later renamed the Virgin River), Rio de Pilar (later known as Ash Creek), and Hot Sulphur Springs (Alder and Brooks 1996; Bradley 1999). Another early explorer, Jedediah Smith, followed parts of the Dominguez and Escalante Old Spanish Trail, of which various portions were later referred to as the California Trail, through Washington County in 1826 and 1827. His route created a new pathway for pioneers traveling from the East to California, and was widened to an actual wagon road in 1849. Other explorers to follow in these footsteps include John C. Fremont in 1844 and Mormon pioneer leaders from Salt Lake City in 1847 (Alder and Brooks 1996).

Important to the Mormon colonization effort was the organization of an Indian mission in Harmony in early 1854. Jacob Hamblin, a Mormon explorer and settler of Kane County, led the effort to establish harmonious relationships with key Native American leaders. His knowledge of the area also facilitated government exploration and mapping projects in the area, including a Colorado River voyage with John Wesley Powell in 1871 that documented the landscape of Glen Canyon and the present-day city of Kanab. While Kanab is the principal settlement in Kane County, small towns in Long Valley are important centers of agriculture and stock-raising. In 1862, John and William Berry first led a team of ranchers into the Long Valley area in search of rangeland for their cattle. The area was called Long Valley due literally to its length (a long narrow valley situated between high mountain walls), fertile land, and proximity to water. The first settlement in the valley was probably that of Berryville (later renamed Glendale), established by the Berry brothers in 1864. Berryville was abandoned in June 1866 due to conflicts between the Mormon settlers and Pauite and Navajo tribes in the area. This pattern of settlement was common to many of the small towns in Long Valley throughout the late 1800s. On January 16, 1864, the Utah Territorial Legislature approved an act that officially created Kane County. Its boundaries were defined on the west to

include the upper Virgin River area, including Virgin City, the principal town in the new county at the time (Bradley 1999:56-59). Kane County remained isolated because of its challenging landscape, its relatively small population, and its lack of connection to railroad lines.

The town of Alton is a small ranching community located near the head of Long Valley. It originally developed from Upper Kanab. It was first settled by Lorenzo Wesley Roundy when he brought his family to Upper Kanab Creek in 1865. Historically, this area had tall grass, good fodder for their animals, streams of clear water, abundant wildlife in the nearby mountains, berries and other wild fruit, and timber for homes and fences (Bradley 1999:65). The settlement was first called Roundy's Station and the immigrants built two log cabins that first summer. In 1865, the Mormon Church ordered inhabitants of Upper Kanab and other small settlements to go to Kanab, Dixie, and larger towns in the area to help fortify them against Pauite raids (Ibid 65-66). Settlers did not return to Upper Kanab until 1870, when Lorenzo Roundy's nephew, Byron Donalvin Roundy, and his wife settled there. Byron and his brother, William Roundy, organized a cattle company called the Canaan Cooperative Stock Company, headquartered in St. George. In 1882, Edwin D. Woolley and Daniel Seegmiller also brought their families to settle in Upper Kanab. Two buildings, a schoolhouse and a recreation hall, were erected in 1885 at the head of the Virgin River. During the late 1880s, when the federal government began to crack down on the polygamists of Utah territory, many Mormon men fled to the area to escape marshals (Ibid 143-149). In 1887, the communities of Ranch, Upper Kanab, and Sink Valley joined together to form a LDS ward. In 1908, the town acquired its present-day name of Alton during a May Day celebration drawing. Charles R. Pugh, who had been reading a book about the Alton Fjord in Norway, suggested the name. The population of the town peaked at 350 in the 1930s (Ibid 210). In the post World War II years, coal reserves were discovered near Alton, and the Smirl-Alton coal mines extracted an average of 40 tons daily in 1949. Today, Alton is home to fewer than 100 people, and its main sources of livelihood stem from the timber industry and its potential for coal mining.

Today, most traffic through the area is generated by tourists headed to attractions such as Bryce Canyon National Park, Zion National Park, and Grand Staircase-Escalante National Monument. Bryce Canyon, the southern part of which lies in Kane County, was designated a national monument by President Warren G. Harding in 1923, and elevated to National Park status in 1928. Originally, the boundary of Zion National Park ended at the Washington-Kane County State line. In 1930, it was expanded to include part of Kane County, which was made accessible by the Zion-Mt. Carmel tunnel and road (Bradley 1999:218). Grand Staircase-Escalante National Monument was established by President Bill Clinton on September 17, 1996. The monument comprises approximately 1.7 million acres in Kane and Garfield Counties. These major tourist destinations are all accessible via US Highway 89, which bisects Long Valley and proceeds through every town in Kane County except Alton (Ibid 8).

SITE DESCRIPTIONS

42Ka2042

The site is a prehistoric temporary camp located on the top and slope of a knoll (Figure 1, Figure 2). The site contains 171 flakes and eight tools. The lithic tools include one utilized flake, three bifaces, two cores, one ground stone and one hammerstone. Tool 1 is a chert ground stone. Tool 2 is a quartzite core. Tool 3 is a Stage 1 chert biface. Tool 4 is a utilized chert flake. Tool 5 is a sandstone hammerstone. Tool 6 is a Stage 3-4 chert biface fragment. Tool 7 is a Stage 3 chert biface. Tool 8 is a chert core fragment. Secondary and tertiary flakes are common in the debitage, while primary flakes and shatter are rare. The lithic debitage material types include chert, obsidian and quartzite. Feature A is a concentration of fire cracked rock and lithic debitage located within an area of darkened soil. The concentration measures 7 m in diameter. Feature A is located on a sloped area near a small drainage system. This is an extensive temporary camp with a several types of lithic tools, a fire-cracked rock feature, and additional potential for subsurface cultural remains. The site is evaluated as eligible under Criterion (D) because it could contribute to such research topics as site function, chronology, subsistence, spatial organization and material culture.

42Ka2068

Originally recorded in 1980, this site contains both a prehistoric and historic component. The historic component partially overlaps the prehistoric component, however, portions of the aboriginal occupation still retains integrity (Figure 3). Prehistoric diagnostic artifacts include one projectile point midsection and one biface fragment. Tool 1 is the point midsection and measures 1.3 x 1.8 x 0.4 cm. This tool was manufactured from a white chert and has snap fractures at both the proximal and distal ends. Tool 2 is a red mottled Stage 2 or 3 biface. Debitage is dominated by shatter (flake fragments, broken flakes, and angular debris) along with lesser amounts of tertiary, secondary and primary flakes. Lithic materials include a wide range of colored cherts (white common) and one piece of obsidian. No cultural features were observed on the surface; however, the site retains good depth potential.

The historic component represents an abandoned farming/ranching habitation and contains several structures, both architectural and landscape, as well as artifacts. The property was patented by James Swappe on August 9, 1889 under the Homestead Act of 1862. Mr. C. Butron Pugh, a historic informant, stated that his grandfather purchased the ranch in 1908 from the Robinson family (personal communication, 2006). This site was previously recorded in 1983 and was described as containing a barn, a shed, a bunkhouse and a corral. Mr. Pugh stated that in addition to the currently visible structures (granary, corral, and cellar) other structures located on the ranch included: a small three room house, a large barn with a stone/rock foundation, a blacksmith shop, a bunk house, a washhouse, a springhouse, two outhouses (used consecutively), and "rip-gut" or pitchpole fencing to the north.

The documented historic features include a granary, a corral, a cellar, several fences, as well as historic artifacts. The granary is constructed of lumber, log, and stone and was divided into two rooms with storage above. The granary is slightly elevated from the ground surface by log stilts and a stone foundation with possible ditching around the foundation; perhaps as a measure to avoid flooding and/or rodent infestations. This structure is constructed with large log cross beams, and V-shaped log construction, with lumber paneling and floorboards. The roof has collapsed into

the building and the door frames are partially collapsed and the two doors are blocked. Mr. Pugh stated that the door hinges for the granary were made at the on-site blacksmith shop. One room contained several hooks and some leather strapping, while the other room is completely open and a half swing door connects the two rooms. The storage area above has remnants of hay.

The corral is constructed with a log fences and log upright beams and the chute is made of milled lumber with a couple log beams at main support locations. The corral has been reinforced with wire and some metal fencing and was used into the 1980s according to the original investigator and the historical informant, Mr. Pugh. The corral also contains an old dodge chute that was used to separate the sheep herds. The masonry cellar is approximately 120 cm deep with the uppermost level of stone collapsing. The walls are otherwise still in good shape. The log beams that would have supported the ceiling for the cellar are partially burnt and caved in. The cellar depression is partially filled with various debris including glass jars and bottles, metal cans, and some plastic bottles with materials dating between 1920 and the 1980s. Mr. Pugh stated that the cellar was used to store and age cheese made by his grandmother. Three fences surround the site area: one lines the two-track drive; one fence marks a field boundary on the north side of the two-track; and one fence marks a field boundary on the south side of the two-track. Landscape features include the agricultural field around the granary and corral and the oak trees. To the east of the granary there is also a stand of live oaks and rip-gut fencing with a large quantity of wild rose bushes that appear to be planted in rows and maintained. Mr. Pugh stated that much of the rip-gut fencing is in good condition, however several of the uprights were replaced in the 1950s due to rotting.

Historic artifacts include glass, ceramic, and other domestic item. Glass consists of several hundred brown and clear fragments and lesser amounts of amethyst and aqua colored glass. Most likely a significant amount of the container fragments are from canning jars, although few metal canning rings were found. None of the glass artifacts had manufacture's trademarks which would have aided in temporality. Most of the ceramics occurred at the location where the large house was said to have existed. The most prevalent type of ceramic was the hard paste porcelain "Boyd's Genuine Porcelain Lined Cap" canning lid. In addition sherds from a Flow Blue vessel (est.1820-1870), decal decorated sherds, and plain whiteware fragments were observed. Most of the tin cans were disposed of in the open cellar. These include four "Punch Here" milk cans, a Spam meat can, an internal friction cocoa can, and four oil cans.

Although the prehistoric component has been disturbed by the later historic occupation, it still retains integrity of location and setting, a diversity of lithic artifacts and material types, as well as potential for subsurface cultural remains (Criterion D). The historic component is also considered significant because of its potential to provide additional information concerning spatial patterning, trash disposal patterns, consumer behavior, and socioeconomic status. The structural features (granary, cellar, corral) fail to embody the distinctive characteristics of a type, period, or method of construction (Criterion C) nor is the property associated with any person(s) or event(s) that have made a significant contribution to national, state, or local history (Criteria A and B). Hence, 42Ka2068 is recommended eligible to the NRHP under Criterion D because it is likely to yield important information about the history and prehistory of the area.

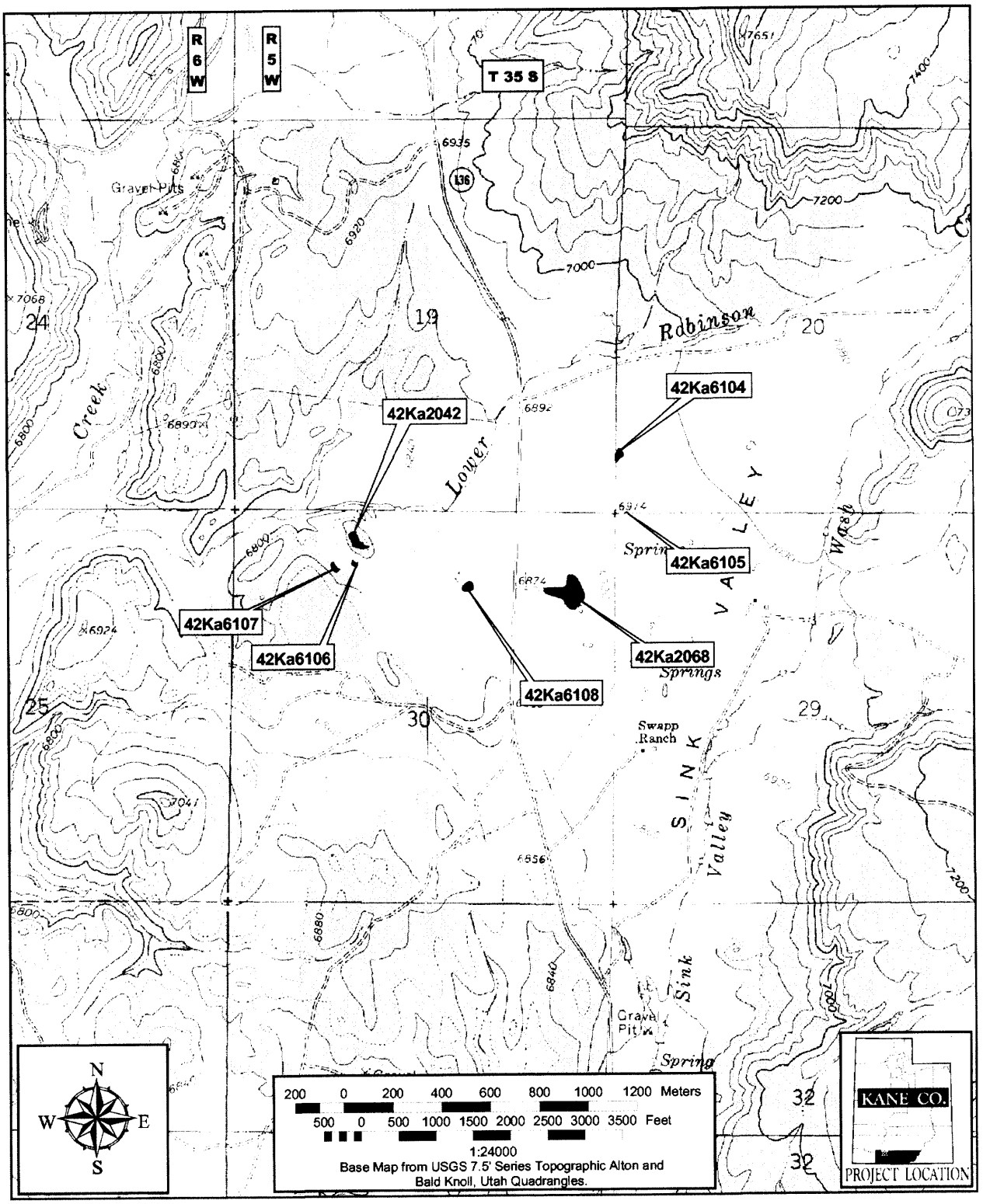

Figure 1. Location of Sites 42Ka2042, 42Ka2068, 42Ka6104, 42Ka6105, 42Ka6106, 42Ka6107, and 42Ka6108, Kane County, Utah.

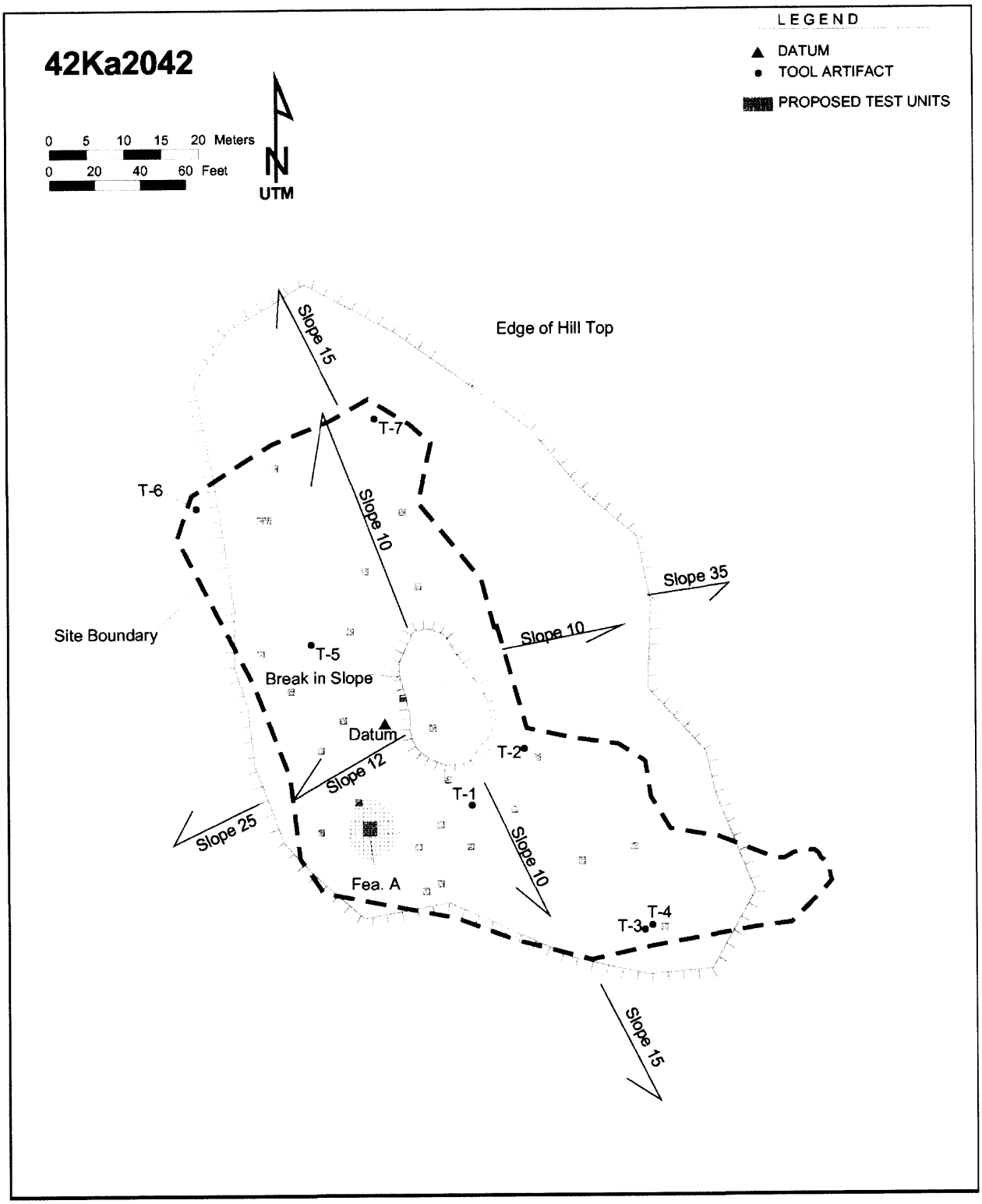

Figure 2. Site Map of 42Ka2042.

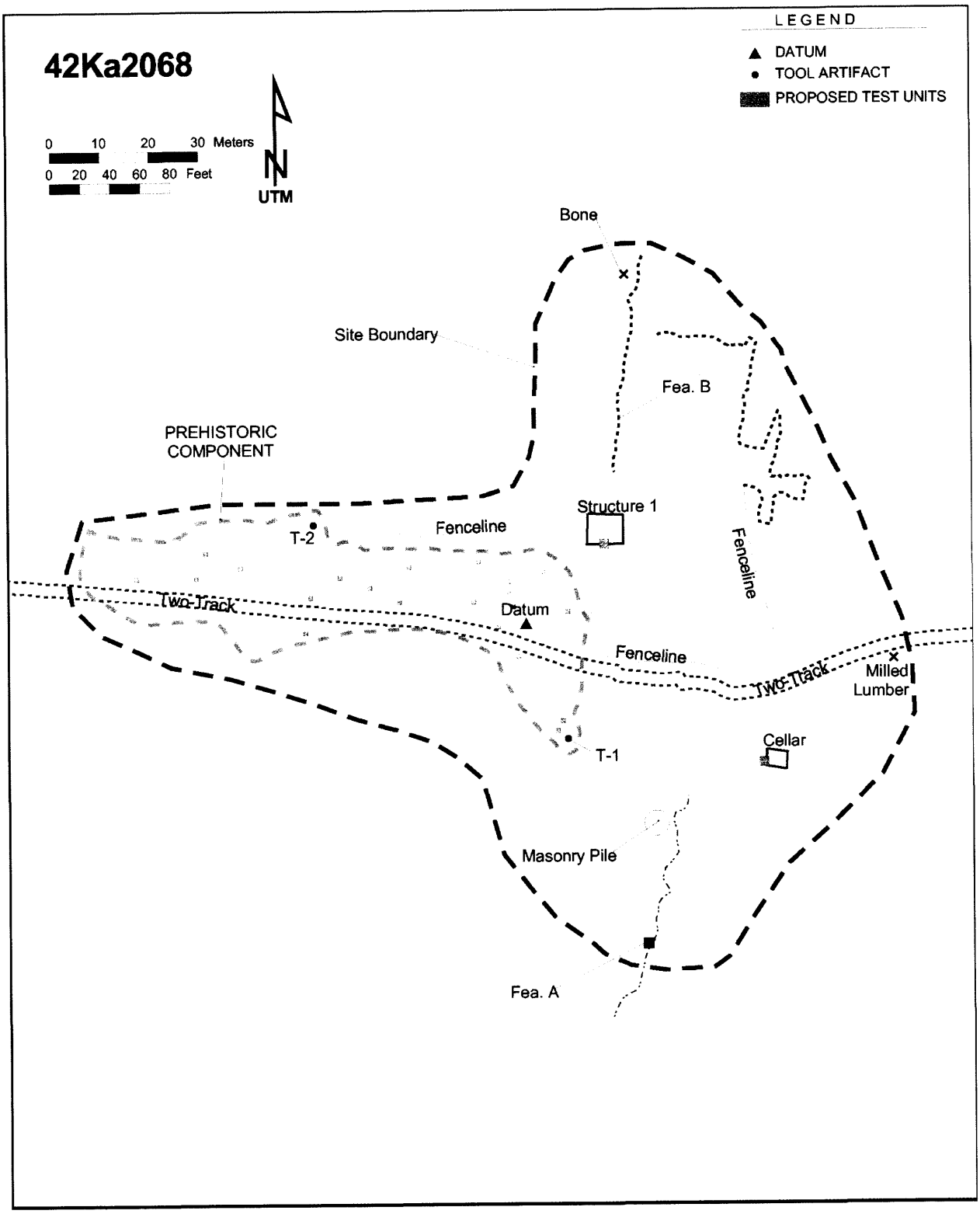

Figure 3. 42Ka2068 Site Map.

42Ka6104

This is a sparse lithic scatter situated on the slope of a low north-south trending ridge in Sink Valley (Figure 4). The site contains 29 flakes and seven tools. The tools includes two projectile points, three bifaces, a utilized flake, and a core. Tool 1 is a Stage 2-3 chert biface. Tool 2 is a chert projectile point tip. Tool 3 is a utilized chert flake. Tool 4 is a Stage 3-4 biface fragment that may have been heat treated. Tool 5 is an Elko projectile point that is broken at the notches, only the base with one notch remains. It is possible that it has been heat treated. Tool 6 is a Stage 5 obsidian biface. Tool 7 is a quartzite core that may have been utilized. The debitage is dominated by shatter, while tertiary and secondary flakes are common, primary flakes and cores are rare. The material types include chert, quartzite, and obsidian. This is a low density lithic scatter affiliated with the Archaic Stage which contains several classes of lithic artifacts. The site retains integrity of location and setting, spatial patterning, and good potential for subsurface cultural remains. The site is evaluated as eligible under Criterion D, as it is likely to contribute to such research topics as site function, chronology, subsistence, material culture, spatial organization and lithic procurement.

42Ka6105

This is a low density lithic scatter of Protohistoric/Contact affiliation located at the bottom of a southwest facing slope in Sink Valley (Figure 5). Cultural materials include 18 flakes and three tools, which includes a projectile point and two bifaces. Tools 1 and 2 are Stage 1-2 chert bifaces. Tool 3 is a chert Desert Side-notched projectile point. The debitage is dominated by shatter, while tertiary flakes are common, secondary flakes and primary flakes are rare. The material types include chert, quartzite, and obsidian. The site retains integrity of location and setting, spatial patterning, and good potential for subsurface cultural remains. The site is evaluated as eligible under Criterion D, as it is likely to contribute to such research topics as site function, chronology, subsistence, material culture, spatial organization and lithic acquisition.

42Ka6106

The site consists of a sparse lithic scatter located at the bottom of a southwest-facing slope in Sink Valley (Figure 6). The site contains 18 flakes and two tools, which includes a chert projectile point mid-section, and a chert awl/drill. The debitage is dominated by shatter, and contains very few secondary or tertiary flakes, and no primary flakes. The material types include chert and obsidian. Although the site exhibits a limited assemblage size, it lies in an area of alluvial deposition with good potential for subsurface cultural remains. Therefore, it is recommended eligible to the NRHP under Criterion D because it is likely to yield additional information relevant to the history of the area.

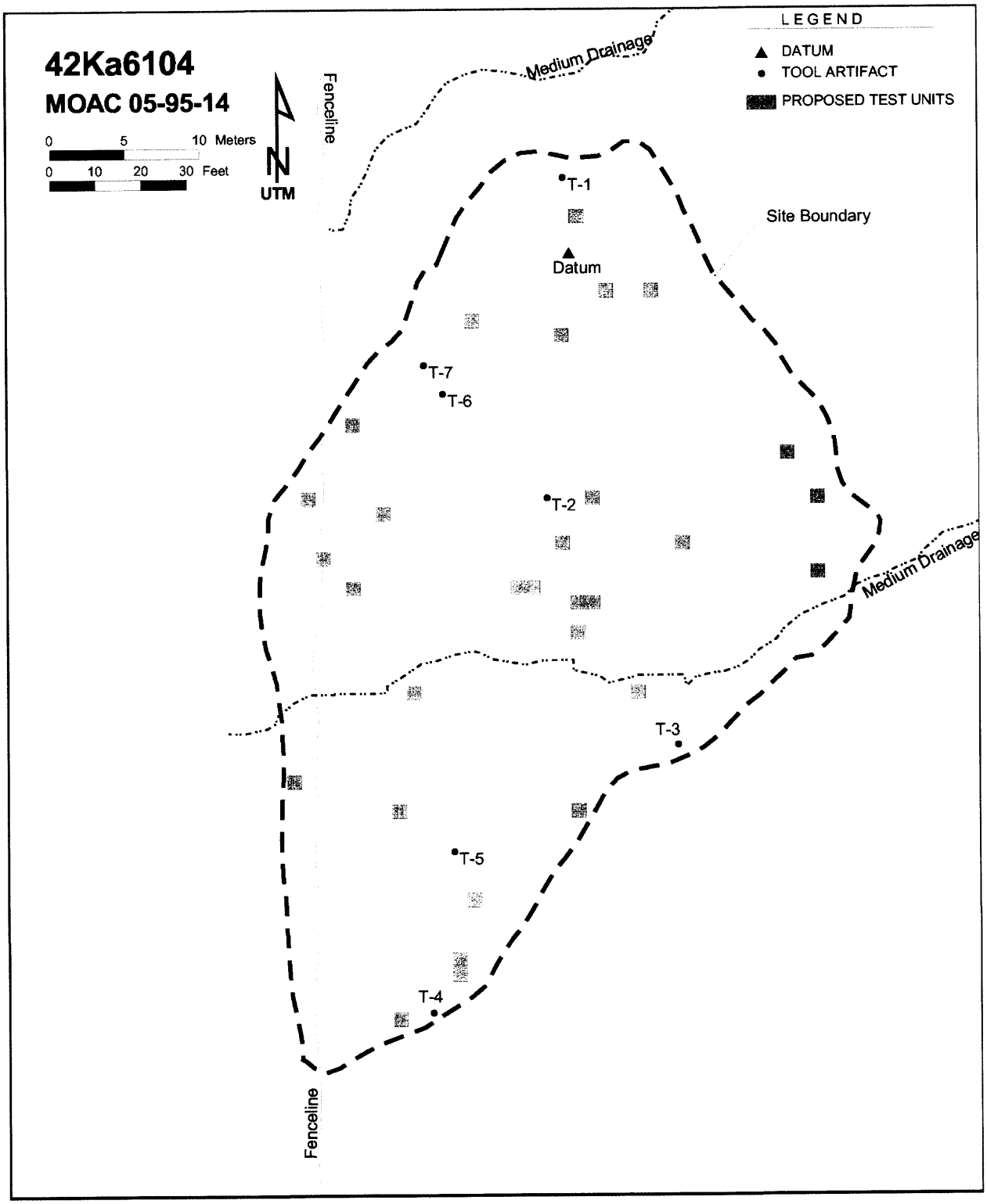

Figure 4. 42Ka6104 Site Map.

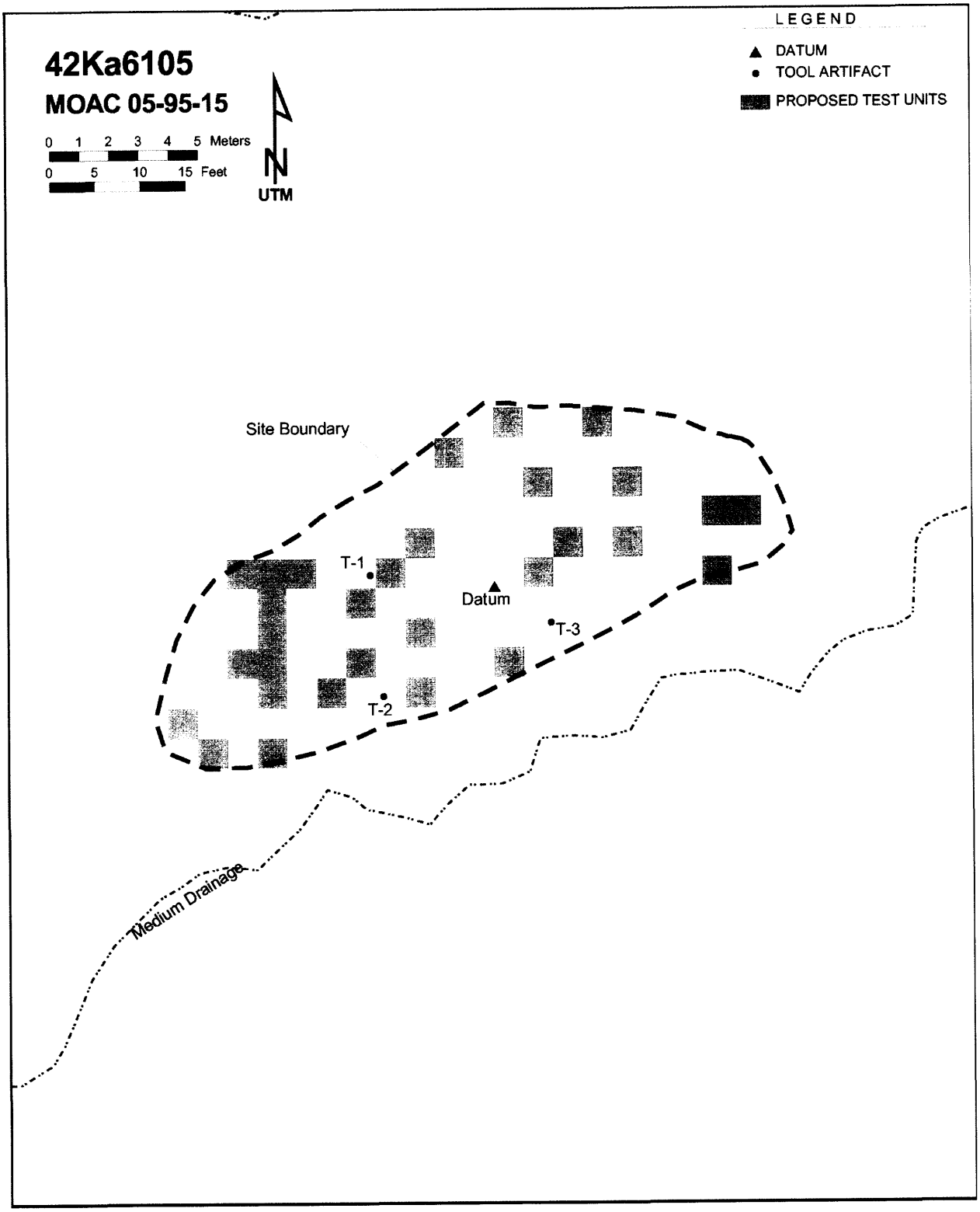

Figure 5. 42Ka6105 Site Map.

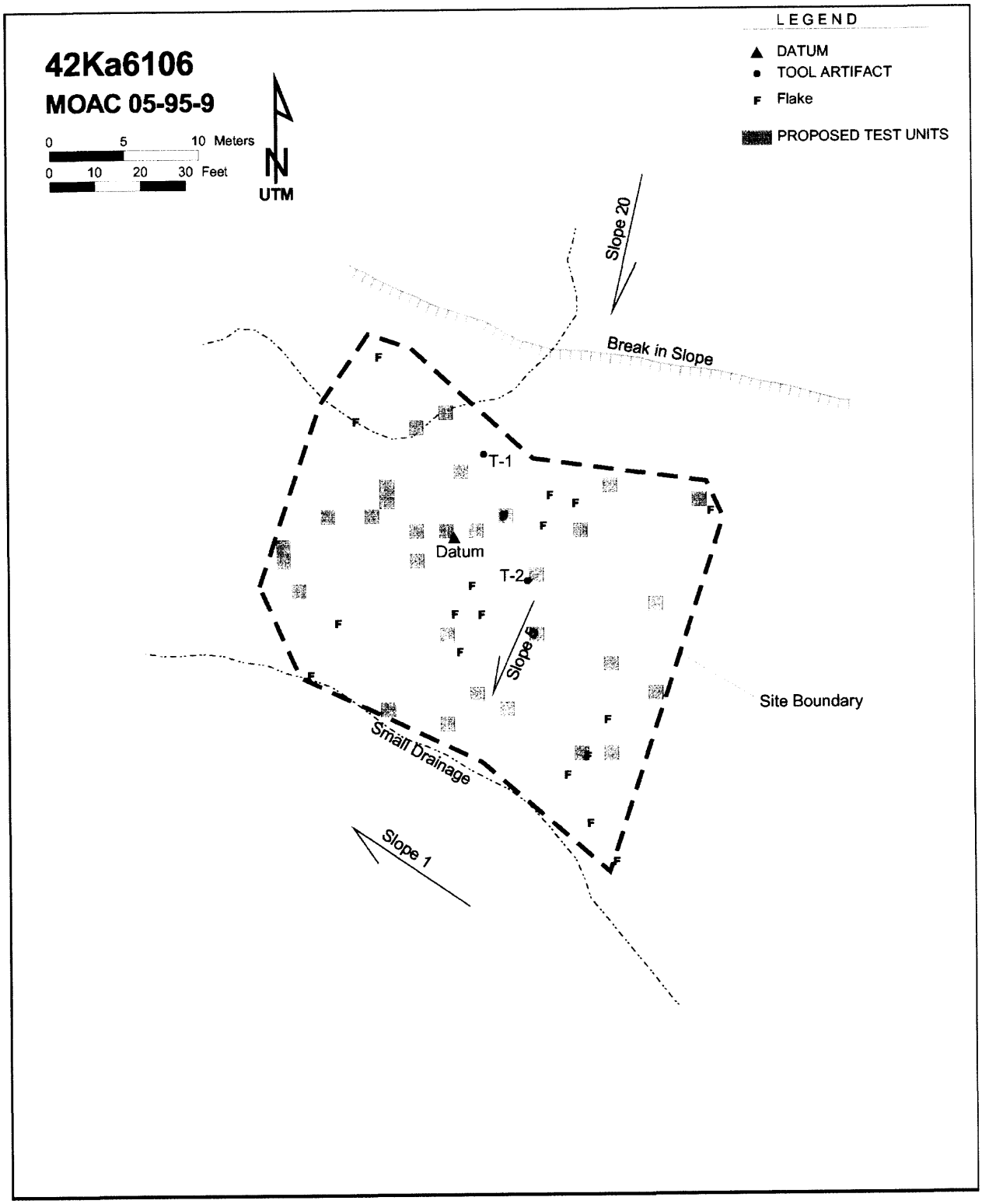

Figure 6. 42Ka6106 Site Map.

42Ka6107

The site is a lithic scatter that is located in and around three drainages at the bottom of a northeast facing slope (Figure 7). Cultural materials consist of 34 flakes and two tools, which are both utilized flakes. The debitage is dominated by shatter, tertiary flakes are common, secondary flakes are rare, and primary flakes are nonexistent. The material types include chert, quartzite, and obsidian. Although the site exhibits a limited assemblage size, it possess integrity of location and setting and lies in alluvial deposits with good potential for subsurface cultural remains. Therefore, it was recommended eligible to the NRHP under Criterion D because it is likely to yield additional information relevant to the history of the area.

42Ka6108

The site is a dense lithic scatter that is located on a small rise and slope along the west side of Sink Valley (Figure 8). The site contains more than 200 flakes and 19 tools. Two lithic concentrations were noted indicating spatial patterning. The chipped stone tools documented at the site consist of ten utilized flakes (Tools 2, 4, 8, 10, 11, 13, 14, 15, 18, and 19), seven bifaces (Tools 3, 5, 6, 7, 9, 16, and 17), a Hawken Side-notched projectile point (Tool 1), and a projectile point tip of unknown type (Tool 12). The debitage is dominated by shatter, tertiary flakes are common, secondary flakes are rare, and primary flakes are nonexistent. The material types include chert and obsidian. In addition, two historic artifacts were observed, a hole-in-top milk can and an earthenware vessel sherd. This Early Archaic site exhibits an assemblage size and diversity that could contribute to such research topics as site function, chronology, subsistence, material culture, lithic acquisition and spatial organization. Hence, the site is recommended as eligible to the NRHP under Criterion D.

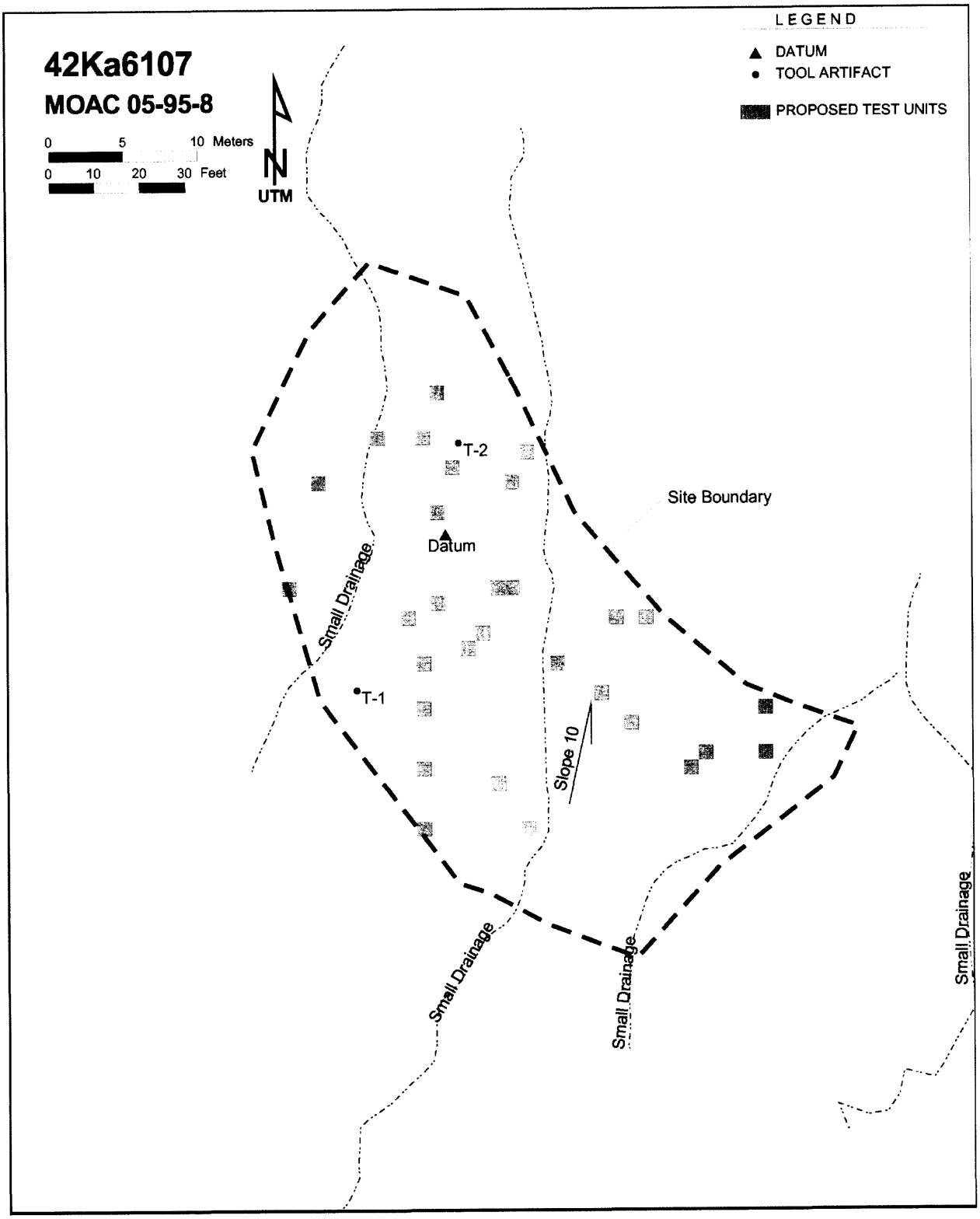

Figure 7. 42Ka6107 Site Map.

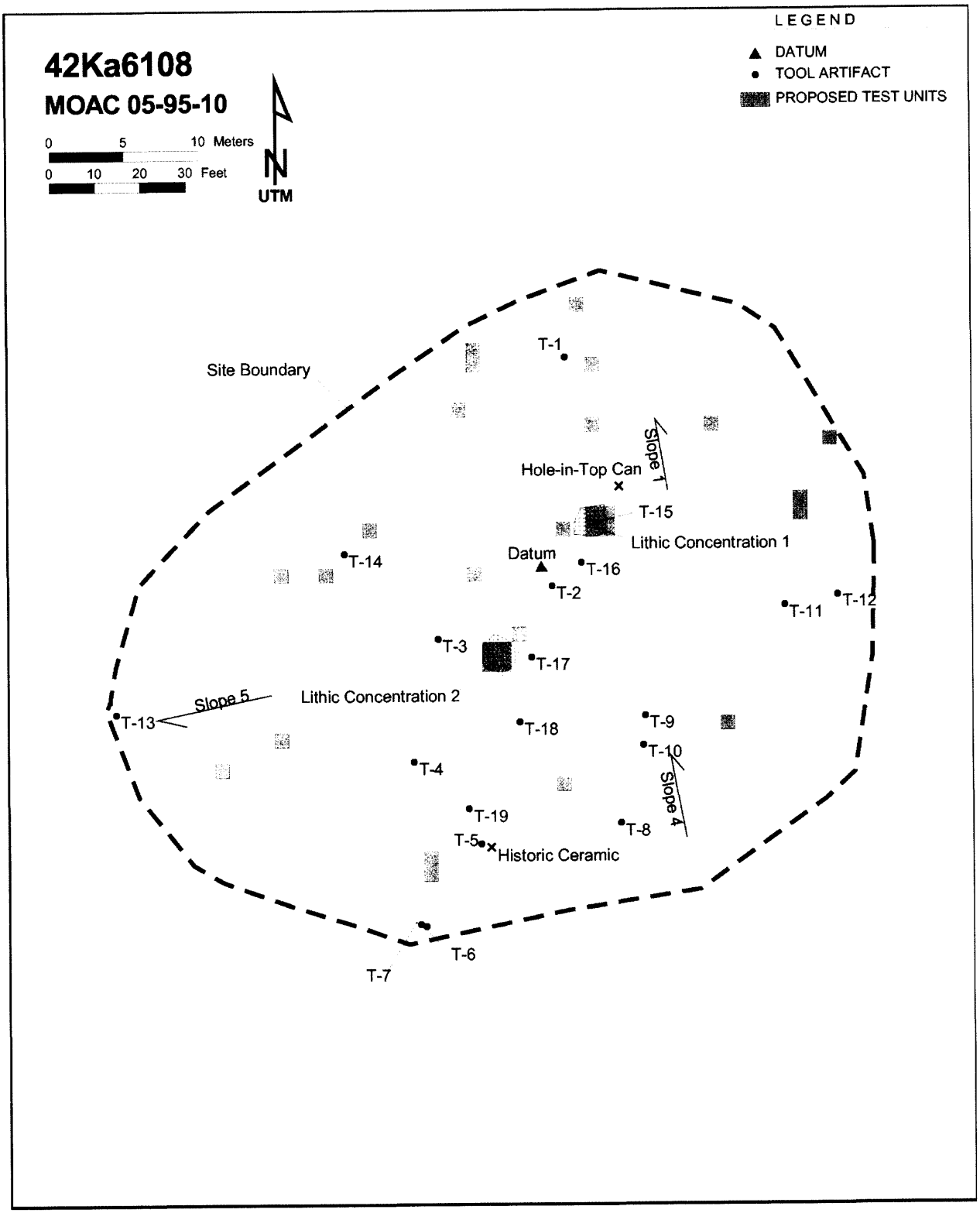

Figure 8. 42Ka6108 Site Map.

DATA RECOVERY FRAMEWORK

Prehistoric Framework

Inevitably research programs, whether academic or mitigation, are guided by some general or specific theoretical framework. In the case of many mitigation efforts in Utah, an emphasis is placed on a series of research domains which include cultural affiliation and chronology, site function, site structure, technology, subsistence, interaction, settlement, site formation processes, and ideology (eg. Ahlstrom et al. 1999; Firor et al. 1998; Tipps 1995; Tipps et al. 1996; Westfall 1987; Westfall et al. 1987; among others). The systematic approach, introduced to archaeology by Binford (1962), conceptualizes different components, or subsystems, of a society and analyzes them separately and then as part fo th entire system. Redman (1973:62) outlines a systematic organizational strategy for field investigations that includes four fundamental principles: 1) the explicit use of both inductive and deductive reasoning in the drafting of research designs; 2) programmatic and analytical feedback; 3) explicit utilization of probability sampling; and 4) the formulation of analytical techniques that are appropriate to the hypotheses and the subject matter. The four principles are then applied to a multistage sampling design that includes general reconnaissance (Stage 1) of the region, intensive survey (Stage 2), a controlled surface collection (Stage 3), and excavations (Stage 4) (Redman 1973:64). Previous work in the Alton Amphitheater includes general reconnaissance and an intensive survey (see Previous Archaeological Work, pages 3 and 4). Surface collection and excavation are proposed in this research design as the next stage of mitigation.

Taphonomy is relevant to this project as the contexts of buried artifacts is questioned. Taphonomy has been described as one of the sister disciplines of archaeology (Gifford 1981) because it involves the formation of the archaeological record and forms the basis for understanding not only how cultural materials become buried, but how those items are altered (Binford and Ho 1985; Gifford 1981; Lyman 1994). Studying the formation of the archaeological record takes into account not just archaeology, but geomorphology, climatology, and other related disciplines. Experimental studies also come into play to demonstrate how artifacts, features, and the like are modified through time as a result of post-depositional processes, both natural and cultural. Are artifacts in buried contexts from occupations of the site location different from those occupations represented on the surface? Or are the artifacts in the subsurface context the result of mixing, sorting, or some other form of vertical displacement? Numerous archaeologists have been concerned with vertical displacement of artifacts, whether through the soils and sediments or downslope displacement (Baker 1977; Baker 1978; Gifford-Gonzalez et al. 1985; Harris 1979; Hofman 1986; Rick 1976; Rowlett and Robbins 1982; Schiffer 1976). Discerning the variability between the surface and subsurface artifact assemblages, or lack thereof, may allow for extrapolations to be made about other previously recorded sites in the surrounding area. According to Redman and Watson (1970), these types of relationships are generally assumed, either positively or negatively. If it is possible to determine that the surface assemblage accurately reflects all the types of activities that occurred at the sites, generalizations concerning inter-site relationships, land use, mobility, and subsistence organization (Chatters 1987; Cowen 1999; Kuhn 1994; Sullivan 1995) can be addressed.

Controlled surface collection yields a coherent relationship between the surface and subsurface artifact assemblages of a site, such that a complete collection of the surface followed by test excavations have elucidated the variables and parameters of the surface distributions and which have the greatest significance for predicting subsurface distributions form surface data

(Redman and Watson 1970). The variables that determine artifact patterning include the depositional and erosional processes that have been operative at the site, the number of cultural periods or phases, and the number of occupations at the site. Redman and Watson's (1970) intensive surface collection of two prehistoric mound in southeastern Turkey defined patterns of cultural debris and created artifact distribution maps from which the authors inferred functionally specific activity areas. Test excavations at the site supported the authors' hypothesis that the surface distribution of artifacts is significantly related to the distribution in the subsurface matrix of that site (Ibid.:289). Redman (1987:251) cautions that there are situations in which systematic surface collection varies in its applicability. The nature of ground cover or systematic disturbance of the site will make surface collection less effective and high densities of surface artifacts do not imply features directly below nor does it imply the presence of a high artifact quantity below. Surface artifact densities are a result of post-depositional processes and thus varying portions or ratios of artifact categories may be more representative than absolute counts.

Other archaeologists have also made inferences about site subsurface characteristics from surface materials. Schlanger and Orcutt (1986) have examined the relationship between architectural site types and surface features and have modeled functional site types and surface artifact assemblages from data collected by the Dolores Archaeological Program, in southwestern Colorado. As architectural remains are not always well preserved or easily located in this area, the authors derived models of site types and site functions through an examination of surface assemblages. Discriminant analysis was used to evaluate a set of variables in terms of their utility in differentiating between groups of cases and indicated the at discriminant function contrasted with the site assemblage type; either limited activity loci, seasonal loci, and habitation loci (Schlanger and Orcutt 1986:304). The variables used in for discriminant analysis were the assemblage proportions of 20 artifact types and proportions representing measures of energy expenditure for the production of artifact types (Ibid.:301-302). Though the accuracy of classification was low when the discriminant function was used to classify new sites, the authors attribute this to uncontrolled variability in the site assemblages (Schlanger and Orcutt 1986). Of the prehistoric sites addressed by this research design, no architectural remains or features were reported during initial site survey and their absence may indicate non-habitational site functions (i.e. limited activity or seasonal loci).

Most of the archaeological information we have pertaining to the sites in and around Alton Amphitheater comes through CRM related surveys with the main objectives of locating cultural resources and determining the eligibility of the sites for inclusion to the National Register of Historic Places. These surveys identified numerous prehistoric sites consisting chiefly of lithic artifacts, no discernible structures, and very few features. The lack of features may be due to the nature of the site recording, as indications of features may not be visible on the surface. Another possibility is that features do not exist or traces of them have vanished as a result of time and geomorphic processes. What survey projects have revealed, however, is a relatively long and continuous use of the Alton Amphitheater by various indigenous populations including Archaic, Fremont, Anasazi, and Ute peoples. A stratified probability sample inventory of the Kaiparowits Plateau was conducted in 1998 and was designed to provide information on the density, distribution, and diversity of cultural resources in the region (Geib, Collette, and Spurr 2001). This survey identified prehistoric remains dating from the early Archaic through the Protohistoric; including Archaic, Fremont, Anasazi, and Late Prehistoric (likely Southern Paiute). While Archaic sites were numerous across the survey area with abundant cultural remains, small Late Prehistoric sites containing few cultural remains were identified to have the greatest density. Sites attributed to the Archaic period are dominated by hunting camps. Importantly, the author notes that many Archaic sites on the Kaiparowits Plateau appear to be mainly surface phenomena and appear to have little

potential for buried cultural remains (Ibid.:7-5). Residential and hunting camps were identified with equally high frequency for the Fomative period, and together represent more than half of the identified Formative period sites. Of the identified Late Prehistoric site types on the Kaiparowits Plateau, hunting camps were identified with the greatest frequency (Geib, Collette, and Spurr 2001).

Historic Framework

Domestic archaeological sites include the remains of residential occupations that include dwellings, wells, privies, gardens, middens, and sheet refuse deposits. Additionally, homesteads include barns, outbuildings, and agrarian landscape features. Common issues addressed by archaeological research on domestic sites include consumer behavior patterns and modernization (Hardesty and Little 2000:120). The Homestead Act of 1862 granted free land parcels to settlers in exchange for their agreement to live on the land, build a house, and make agricultural improvements. The archaeological remains of such homesteads date from the 1860s and well into the twentieth century.

Historical archaeologists often use the concept of a historical context as a method of structuring research and ordering data. Bowers (1998:1) defines a historical context as: "How a particular community theme is expressed at a particular time and place...based upon the major changes to the community, which have been influenced by such factors as: exploration, settlement, urbanization, commerce and economic development, transportation, disasters, and community permanence." Specific historical contexts are derived primarily from established histories of the town, county, or region under investigation, and serve as an interpretive framework with which to investigate archaeological data at various scales of analysis. For example, at a regional scale of analysis, Hardesty (1991) developed an approach that identifies several interpretive themes applicable to the entire Inter-mountain West. They are:

1. Evolution of hydraulic societies (control of water)
2. Uncertain enterprises and the boom-bust cycle
3. The evolution of conquest society
4. Frontier urbanism
5. Dependency on the Federal government

According to Hardesty, as a "geographical place with a distinctive regional culture" (Ibid.: 29), the Inter-mountain West is defined by these several major themes or historical contexts. Therefore, these themes have direct relevance to an archaeological investigation, as all are expected to have had a major impact on settlement patterns, economic and social organization, and ideology. For example, as "hydraulic societies", many communities in the Inter-mountain West "created not only a massive network of dams, reservoirs, canals, and irrigation ditches but also a new social order with an administrative bureaucracy, a new settlement pattern, and the emergence of a new agrarian middle class" (Ibid.:31). Hardesty (1991) argues that the archaeological record may be a particularly good source of information about all of these major themes and, as a result, "all of these topics can form the foundations for middle range theory building that can be tested with hypotheses using historical archaeological data" (Reed and Horn 1994: 233).

Additionally, Stein (1990:30-34) has put forth several research themes and questions for developing a homestead context in Arizona. These include:

- To what extent were homesteads economically self-sufficient?
- To what extent was agriculture practiced?
- What was the role of women?
- What were the patterns of land use?
- How did the social mores of particular groups evolve in response to life on the frontier?
- What were the long-range goals, or motives, of homesteaders in staking claims in Arizona, and how successfully were these goals met?
- What factors contributed to the success of a homestead, as measured by the conveyance of a title patent from the government to the claimant?

Such research themes have been successfully addressed in archaeological investigations at the Brown Homestead in Yavapai County, Arizona (Ayres and Seymour 1993). Here, archaeological excavations were designed to address research topics that relate to subsistence and food behavior that were applied to the understanding of the economic viability of the homestead, the sociocultural interaction of the homestead's occupants with neighboring homesteaders, and investigations into the vernacular architecture to explore issues of economic and social status.

In short, identifying historical contexts at a particular scale of analysis (national, regional, local) provides a conceptual and analytical background that serves to structure an archaeological investigation. The challenge for the archaeologist is to not only determine how, and the extent to which, these processes are reflected in the archaeological record of the particular site or sites under investigation, but to examine the inherent assumptions and generalizations underlying the identified historic contexts. In this way, an archaeological analysis contributes to a more complete understanding of the past by determining the relevance and/or validity of the established historical themes to a particular community or region.

RESEARCH GOALS AND QUESTIONS

Beyond the mitigation goals of the project, this research will focus on several goals in order to gain an insight into prehistoric activities and resource utilization in the Alton Amphitheater region and insight into early historic homesteading in the region. The prehistoric research goals include the collection of baseline data (environmental setting, chronology, site function, subsistence, and technology) and identifying variability between surface and subsurface assemblages. The collection of baseline data from these sites will enable archaeologists to generate better questions for future excavation in the area. Although these sites are not representative of all the site types in the Alton Amphitheater, the information collected during the excavation of these seven sites will be useful for the future mitigation of archaeological sites associated with Alton Coal Development's proposed undertaking on the surrounding BLM lease lands. Of the 94 archaeological sites documented in the Alton Coal lease lands, 64 sites are recommended as eligible to the NRHP and will have to be avoided or mitigated (Stavish 2007). The historic research goals include identifying intra-site spatial and functional patterning, identifying consumer behavior patterns associated with homesteading, and identifying the function or activities associated with the remaining log structure, referred to as the granary.

Prehistoric Sites

Goal 1-Baseline Data

Environmental Setting

Pollen, macrobotanical, and possibly mollusk samples will form the basis of the environmental reconstruction of the sites' environmental contexts during the period that it was constructed and occupied. On-site and off-site sediment samples will be collected and submitted for pollen and macrofossil identification at Paleo Research Institute, in Golden Colorado. Off-site and on-site pollen samples will be compared for similarities and differences in the types and amounts of pollen present. General comparisons will be made with generalized paleoclimate reconstructions for the Greater Colorado Plateau.

Chronology

Sites 42Ka2042, 42Ka2068 (prehistoric component), 42Ka6106, and 42Ka6107 have no culturally or chronologically diagnostic artifacts on the surface, but there is potential for buried cultural remains and excavation might reveal datable features and artifacts. Site 42Ka6104 contained a single Elko projectile point attributed to the Archaic period, during initial surface documentation. Surface documentation at site 42Ka6105 located a single Desert Side-notched projectile point attributed to the protohistoric/contact period. At site 42Ka6108, a single Hawken side-notched projectile point was located during surface documentation and was attributed to the Early Archaic period. These three sites (42Ka6104, 42Ka6105, and 42Ka6108) also exhibit good potential for buried cultural remains, which during excavation may reveal further datable features and artifacts.

Efforts will be made to place site components within previously defined cultural units as appropriate. If possible component data will be compared to more specific units as phases or temporal periods defined for the area. Data recovery at the seven sites will focus on obtaining chronological data from cultural horizons and features that may provide further insight into cultural or temporal affiliation. Relative and absolute dating techniques, including stratigraphy and ^{14}C dating, may be employed to examine the relationship of features and diagnostic artifacts (projectile points and ceramics), and compare them to the known chronologies and cultural traditions of the region. Recovered projectile points will be identified according to the morphological classifications of Holmer (1986) and Holmer and Weder (1980). Recovered ceramics will be identified according to such classifications as Colton (1955) and Pippin 1986).

Site Function

To understand prehistoric land-use patterns, it is necessary to determine the primary function of a cultural component/site. Although prehistoric people may have used individual sites for different activities at different times, insight into site function can be gained through analysis of represented artifact classes, artifact diversity, and cultural features. Many of the sites in the area contain artifact classes (projectile points, scrapers, bifacial knives) typically related to hunting and animal processing activities. To a limited extent the presence of ground stone at one of the sites also suggests the processing of plant materials.

Subsistence

Given that broad temporal occupation of the area and the diversity of subsistence practices, the types of subsistence resources utilized by the inhabitants of the sites can potentially be very large. Evidence for subsistence resources will be gathered primarily from pollen, botanical, and faunal assemblages. Pollen and botanical samples will be taken as described above under the Environmental Setting domain; additional bulk sediment samples will be taken from the features for floatation. Pollen washes will be preformed on appropriate ground stone artifacts. It is unlikely that, given differential preservation of organic materials, that the entire range of resources will be identified or that the relative proportions of the remains reflect the degree of dependence. However, the data will serve as an approximation of subsistence resources.

Technology

Technological organization (c.f. Nelson 1991) of the artifacts will be assessed in regards to mobility, resource utilization, activities (e.g. scraping, cutting, grinding, cooking), and tool diversity. Artifact assemblages will be investigated and analyzed to determine the manufacturing technique, the raw material used, and distinctions between the assemblage at these sites and surrounding sites.

General debitage and tool analysis can aid in the determination of site function and the delineation of activity areas. Spatial patterns in the distribution of lithic debitage (and ceramics), the identification of reduction sequences and the refitting fragmentary tools within the spatial lattice provides the data necessary to identify activity areas possibly reflecting specialized behaviors. Various site function classifications exist for hunter-gatherers (e.g. Binford 1980), semi-nomadic peoples (e.g. Kent 1980), and agriculturists. These models may aid in the interpretation of archaeological remains, but they will be used here only as aids and not as *a priori* categories. Functional inferences concerning lithic assemblages will be drawn from direct measures of lithic diversity and richness at both the debitage and tool level, the presence/absence of certain artifact types, and tool attrition and use history.

Goal 2

The second goal is to determine if differences exist between surface and subsurface assemblages at sites 42Ka2042, 42Ka2068 (prehistoric component), 42Ka6104, 42Ka6105, 42Ka6106, 42Ka6107, and 42Ka6108. If there is no difference between surface and subsurface assemblages, or if it is shown that subsurface artifacts are displaced from the surface/subsurface by various site formation processes, it is possible to extrapolate with some confidence that the surface assemblages at many of the known sites in the Alton Amphitheater and Sink Valley localities are representative of artifact types, frequencies, and activities.

Hypothesis: There is no significant difference between surface and subsurface assemblages.

Alternative Hypothesis: There is a significant difference between surface and subsurface assemblages.

To determine if surface and subsurface assemblages are different or similar, we will use independent sample t-tests, or their nonparametric equivalent (in the event that data other than ratio

level data is used). Samples to be used in testing the hypothesis include artifact frequencies, material type frequencies, and tool type frequencies. If necessary, because of multiple comparison problems resulting from the addition of more samples, an analysis of variance test (ANOVA), supplemented with Bonferonni post hoc tests will be used where multiple data sets can be tested together. Additional samples may result from more than one subsurface artifact assemblage or the addition of unexpected frequency data; however, both these instances are unlikely.

Historic Site (42Ka2068)

Goal 1

The first goal of the historic component of this project is to determine if there is intra-site spatial or functional patterning. The remaining standing structures on the site, a log granary and stone cellar, as well as information provided by an informant, suggest specific use or activities areas; such as residential, domestic food preparation and/or storage, and areas associated with livestock and farming. Remaining structural elements and trash disposal patterns may help to elucidate intra-site patterning and particular sets of cultural behaviors.

Hypothesis 1: There are differences in trash disposal patterns within the historic component of site 42Ka2068.

Alternate Hypothesis 1: There are no differences in trash disposal within the historic component of site 42Ka2068.

Hypothesis: Differences in trash disposal patterns reflect their association or proximity to activities attributed to remaining standing structures and/or structural elements.

Alternate Hypothesis: Differences in trash disposal patterns are not associated with remaining standing structures and/or structural elements.

Historic artifacts identified at the site consist mostly of glass, ceramics, tin cans, and other domestic items. The disposal location of such items, as well as other artifacts associated with agriculture and animal husbandry, may indicate what activities were performed. Artifact distributions and derived artifact groups are likely to demonstrate the functional parallels of structurally based interpretations (see Groover 1994) or interpretations based on information provided by historical informants. Alternatively, a lack of patterning in refuse disposal may reflect the self-sufficiency of early homesteaders. Such that, areas delineated by structural remains or structural elements held little functional classification for the homesteaders and all manner of activities were performed across the site.

Goal 2

The second goal is to determine to what extent the homestead was self-sufficient and whether the data reflect a shift from self-sufficiency to consumer culture. Specific household data help to refine broader community data regarding consumer behavior patterns, as the household is the primary unit of analysis and serves as the unit of economic consumption and production (see LeeDecker 1994). To determine the level of self-sufficiency it will be necessary to look at the

frequencies of canning jars or canning jar lid inserts versus sanitary tin cans and varying frequencies of artifact types (specifically tin can types and their associated contents), frequencies of ceramic vessels and vessel forms (based on rim sherd). A lack of sanitary food cans, meat tins, and evaporated milk cans may indicate a reliance on food products produced at the homestead. Conversely, a higher frequency of consumable goods versus durable goods is likely to indicate a more consumer driven culture. A shift from self-sufficiency to a consumer culture will only be evident, if present, if the site refuse exhibits either stratigraphically distinct deposit levels or if two (or more) disposal events can be identified based on temporally diagnostic artifacts.

Goal 3

Hypothesis: The standing log structure functioned solely as a granary or outbuilding.

Alternative Hypothesis: The standing log structure had two (or more) functions, likely consecutively. The log structure functioned as an early residence and then as a granary/outbuilding.

The remaining standing structure at site 42Ka2068 is a granary constructed with a masonry foundation, large log cross beams, and V-shaped log construction with lumber paneling and floorboards. The granary appears to be the oldest structure remaining on the site. Log outbuildings are relatively rare within the region and its log construction is particularly intriguing as milled lumber would have been available (nearest saw mill in Orderville) at the time of the Pugh family's purchase of the land and residence. Therefore, it is possible that the log structure was a residence for the initial homesteader, James Swapp (land patented on August 9, 1889 under the Homestead act of 1862), and later reused as an outbuilding. To test the above hypothesis it will be necessary to more closely examine the construction and construction methods of the log structure by dismantling the structure and documenting construction techniques and methods. Additionally, excavations in the floor and entrance ways of the structure may reveal artifactual evidence of activities associated with the structure. The presence of artifacts classified as domestic (such as canning jars, items associated with food preparation, ceramics, etc.) in association with the structure would require the rejection of the hypothesis.

SAMPLING DESIGN

The location of excavation units were selected using a simple random sampling strategy. At each site, a grid system was overlaid onto the site sketch map (as described above) and a random sample of units, without replacement, was generated using ArcView software. The purpose of this simple random or probabilistic sampling strategy is to maximize the chance of accuracy for making inferences about the population. In simple random sampling, each individual element (1-x-1-m grid unit) in the population (site) has an equal chance of selection, such that each unit is independent and does not effect the selection of other units. The assumptions necessary for simple random sampling are minimum (Redman 1975:150), and include the boundary of the population (site boundary as defined during the cultural resource inventory and documentation), the sampling frame (1-x-1-m grid units), and the sampling fraction (n=30 m^2). This sampling strategy allows us to collect a representative sample of the subsurface artifact assemblage and is necessary for addressing differences between surface and subsurface artifact assemblages. Importantly, simple random sampling also provides a basis for estimating how likely our inferences about the population are wrong, as well as how much confidence we can place in these inferences (Drennan 1996).

FIELD METHODS

In order to collect the necessary data to address the proposed hypotheses, field and laboratory methods must be compatible with one another, as well as with previous work conducted in the Grand Staircase, if larger research questions are to be answered. Additionally, data recovery at these seven sites, as proposed in this research design, will be used for future management of the surrounding cultural resources (see Stavish 2007) in the Alton Amphitheater and Sink Valley regions. As such, the following field and laboratory methods will be used throughout this project.

The first task at each site will be to produce a detailed planimetric map consisting of site boundaries, surface artifacts, features, landscape features, etc. All prehistoric surface artifacts will be collected and point provenienced with a Trimble. To the extent possible the grid will be oriented to true North. The grid system will consist of a master grid datum located at or near the northwest corner of the site. Radiating from the datum will be an east-west and north-south baseline. Grid units (2-x-2-m), are designated by the number of meters east and south of the grid datum. As such the unit designations will resemble 16S/24E or 02S/32E. Individual grid datums are designated as the NW corner of each unit, unless it is obstructed in some fashion. Once the grid is established, surface "pinch samples" for controls in pollen analysis will be collected and the surface of the site will be surveyed and artifacts will be plotted on the planimetric map.

Excavation will consist of excavation units (1-x-1-m, 1-x-2-m, and 2-x-2-m), which may be expanded into larger block areas if necessary. The units will be excavated by natural layers using the control of arbitrary levels of 10 cm. All subsurface measurements will be made from the unit grid datum located in the NW corner and eventually plotted on the planview map. Excavations will cease once bedrock is encountered or one has excavated through 10-20 cm of sterile fill. Excavation will be done by trowel or shovel with the material removed being screened through 1/4" mesh screen.

At sites 42Ka6104, 42Ka6105, 42Ka6106, and 42Ka6107, we propose excavating a variety of 1-x-1-m and 1-x-2-m units placed randomly across each site, as no artifact concentrations or features were observed during surface documentation. A minimum of 30 m^2 will be excavated at each of the sites.

At site 42Ka6108, we propose excavating a variety of 1-x-1-m, 1-x-2-m, and 2-x-2-m units. A minimum of 30 m^2 will be excavated. A 2-x-2-m unit will be placed in each of the lithic concentrations (Lithic Concentration 1 and 2) and the remaining units will be randomly placed across the site.

At site 42Ka2042, we propose excavating a variety of 1-x-1-m, 1-x-2-m, and 2-x-2-m units. A minimum of 30 m^2 will be excavated. At least one 2-x-2-m unit will be place in Feature A, a firecracked rock concentration with soil staining, and the remaining units will be randomly placed across the site.

At site 42Ka2068, we propose excavating a variety of 1-x-1-m, 1-x-2-m, and 2-x-2-m units. A minimum of 30 m^2 will be excavated. At least one 2-x-2-m unit will be place in or next to Structure 1, the log granary, and at least one 2-x-2-m unit will be placed in or next to the cellar. Additional units will be placed randomly across the site, in both the prehistoric component and historic component of the site.

Once excavation is complete at each site, the site will be scraped to identify features missed by excavation. The heavy machinery that will be employed for this process is a paddle-wheel scraper, which is able to remove about three inches of soil in a lift. Any features encountered during this procedure will be documented in a manner consistent with those identified through manual excavation.

Prehistoric artifacts recovered in situ will be three-point provenienced. If the artifact is not laying level a dip angle measurement will also be taken. If an artifact is large, such as a metate, additional provenience measurements will be taken. Tools, large sherds, vessels, articulated faunal remains, artifact concentrations, etc. will be photographed and drawn in situ. If lithic debitage or small sherd fragments are extremely numerous it may be necessary, because of time constraints, to provenience these materials by quadrant, layer, and level rather than with three point plotting. Artifacts recovered from the screens will be provenienced by grid, layer, and level. Artifacts will be given field specimen numbers at the end of each days work.

Historic artifacts documented during the cultural resource inventory at this site (pieces of glass, tin cans, and ceramic sherds) are common to historic sites in the area. Additionally, a collection of these artifacts is bulky, making long term curation problematic. Hence, a detailed, in-field recording program of all historic artifacts within the excavation area of the total site area will be utilized to collect information. No collection of historic artifacts is proposed, unless a rare, unique, or particularly diagnostic historic artifact is encountered.

Any features uncovered during excavations will be examined, described, drawn, and photographed following recording procedures established by MOAC. Samples of soils, charcoal, bulk matrix, etc. will be taken where appropriate. If it is necessary to trace out a feature that extends into an adjacent unit, excavation of the unit, or a portion thereof, will begin immediately, following the standard excavation techniques described above, to reveal the full extent of the feature. The newly opened unit will be excavated in tandem with the original unit until sterile fill or bedrock is encountered.

Photographs will be taken prior to, during, and after excavation at the sites and excavation units. Photographs will be taken using color print, black and white print, and color slide film. Excavation unit photographs will be taken prior to excavation and a final excavation photo will be taken of at least one unit wall. Photographs will be taken of features prior to and after excavation.

Upon the complete excavation of a given unit, at least one wall will be profiled. The wall to be profiled will be determined by a number of considerations including, but not limited to, unique characteristics of the profile, clearly discernable stratigraphy, evidence of post-depositional processes, and cross-sections of cultural strata. The soil profile will consist of soil descriptions, Munsell color designations, information concerning the depositional environment, and the structure of the matrix.

In the event that human remains are encountered during excavation, all digging activity in that grid and the immediate vicinity will cease immediately. The county sheriff will be notified, followed by the Utah State Archaeologist.

LABORATORY METHODS

It is anticipated that lithic artifacts will make up the bulk of the materials recovered during excavation at sites 42Ka2042, 42Ka2068, 42Ka6104, 42Ka6105, 42Ka6106, 42Ka6107, and 42Ka6108; however, it is probable that faunal remains will also be encountered. There is also a slight chance of recovering other organic artifacts such as basket fragments, wood (both natural and cultural), beads, etc. No historic artifacts will be collected during the mitigation process. Most of the laboratory work for the historic component of site 42Ka2068 will be conducted on site. This involves the measurement by weight and volume of artifacts and artifact classes, recording typological descriptions, and photography or illustrated of diagnostic historic artifacts.

Lithic Artifacts

In order to address the hypotheses, it is necessary to collect both qualitative and quantitative data on the lithic debitage and tools. General debitage analysis will consist of collecting the following variable characteristics for each artifact: material type and color, percent of dorsal cortex and type, platform type, artifact condition, the presence or absence of thermal alteration, the presence or absence of use wear, the technological artifact type, dorsal scar count, and size class.

The analysis design provides the means to collect the necessary information for determining principle reduction strategies represented at the site under investigation. Specifically, the lithic analysis will incorporate the following aspects:

1. Composition of the lithic assemblages with respect to raw materials;
2. Frequency of artifact categories including core reduction debitage, both pressure and percussion biface thinning debitage, other specialized debitage (i.e., projectile points, notching flakes, fluting or channel flakes, etc.), undiagnostic debitage and angular debris, cores and core tools, and expedient and formal tools, including tool-producing tools (i.e., hammerstones, anvils, etc.)
3. Morphological and metric attributes of formal and informal chipped-stone tools for classification, typology, and function determination.

Where applicable, individual concentrations, or spatially discrete units, will serve as the basic units of analysis (see Analysis Section). Analysis of artifacts from sites 42Ka2042, 42Ka2068, 42Ka6104, 42Ka6105, 42Ka6106, 42Ka6107, and 42Ka6108 will center on identifying specific flake types based on studies and debitage typologies devised by Ahler (1989) and Flenniken (1978, 1981). The modified typology includes the following classification scheme.

Debitage: Core reduction includes three distinct levels including primary, secondary, and tertiary reduction. Primary flakes are defined based on a percentage of 90% or higher dorsal surface cortex cover and either a cortical or single faceted platform. Secondary core reduction flakes are defined as those flakes exhibiting cortex covering between 5% and 90% of the dorsal surface and having at least one flake scar. Cortical and single faceted platforms are common and in some instances multifaceted platforms occur. Finally tertiary reduction flakes lack any cortex, have single and multifaceted platforms, but more obtuse platform angles, and a dorsal surface with several flake removal scars (two or more); generally running parallel with the long axis of the flake. The flake curvature becomes more pronounced at this stage. In all three stages of core reduction there is generally little evidence of platform preparation.

Biface thinning debitage breaks down into three categories: edge preparation, percussion biface thinning flakes, and pressure biface thinning flakes. Edge preparation flakes typically exhibit a triangular outline relative to the platform location, making them wider than they are long. Removal of these flakes generally occurs as a preliminary step in preparing the edge of a flake blank (i.e. tertiary core reduction flake) or biface blank for additional biface reduction. Characteristics of percussion biface thinning flakes include multifaceted platforms generally with some abrasion, acute platform angles, and a definite dorsal curvature. In some instances, platforms may show signs of crushing and collapsing. Pressure biface thinning flakes exhibit irregular dorsal topography, steep platform angles with lipping, pronounced dorsal curvature, and are thin and small relative to percussion biface thinning flakes. All non-diagnostic flaking debris (flake fragments, angular debris, etc.) will be grouped into a single category.

Cores: Artifacts exhibiting one or more negative bulb scars and that do not appear to have come from another material are classified as cores. Cores include three subcategories: tested nodules or cobbles, unprepared cores, and prepared cores, which display a prepared platform from which flakes are removed.

Flaked Stone Tools: For the purposes of this analysis, a lithic tool is any artifact exhibiting use-wear. As such, it is necessary to group tools into two major groups: formal and informal, or expedient, tools. The formal category includes tools formed through biface reduction, or other reduction techniques, that dramatically alter the appearance of the original flake blank. Expedient tools include used flakes and retouched flakes where neither the use nor the retouch significantly alters the shape of the blank. As used here, use-wear includes microflaking, polish, striations, battering, edge rounding, abrasion, and edge frosting. Microflaking is generally the most evident form of use-wear and one of the only forms of attrition visible to the unaided eye. Identification of striations generally requires the aid of stereo microscopes (>200 x magnification), or even scanning electron microscopes.

The analysis of utilized and retouched tools will involve assessments of type and extent of use-wear, material preferences, and the relationship between use-wear and core or biface reduction stage. Following Frison and Bradley (1980), biface production stages will be determined. Briefly, the stage reduction sequence includes biface production starting from a blank (Stage I), moving through general stages of shaping and thinning (Stages II and III) to systematic thinning and shaping (Stage IV) to the final retouching and shaping into the desired form (Stages V and VI). Bifaces need not necessarily pass through all six stages before becoming a tool. In some cases it may be necessary to repeat particular stages if the blank or preform breaks during manufacture and some stages may be omitted altogether. Classified as either blanks (Stages I-IV) or preforms (Stages V and VI), these bifaces show no evidence of use. Only those bifaces exhibiting some form of attrition are classified as tools.

Ground Stone Artifacts

Ground stone encountered will be collected and bagged. Once in the laboratory, the ground stone artifacts will be examined and their attributes recorded. Because of the possibilities of obtaining pollen and traces of various residues (proteins, stable isotopes, etc.) the artifacts, particularly the use surfaces, will not be cleaned. Attributes that will be recorded for each piece of ground stone will include material type, color, manufacturing technique (if any), condition, number of use surfaces, size of use surfaces (length, width, and where applicable, depth), attrition of use surfaces (polish, pecking, battering, striations), general cross-section, function, and size (length, width, and thickness).

Ceramics Artifacts

Information collected from ceramic artifacts includes a variety of data that, with additional statistical manipulation, should allow for the hypotheses proposed herein to be addressed. Data collected from sherds will include pottery type, temper, vessel construction, finishing technique, surface manipulation, colors, vessel form, rim diameter (for rim sherds), hardness, firing atmosphere, and weight of all ceramics of a particular type per grid unit.

Faunal Remains

Despite the lack of remains encountered during the cultural resource inventory at these sites, it is assumed that more rigorous field investigation may result in the identification of faunal remains. As such, the following laboratory analysis program is designed to collect the data necessary to address the hypotheses proposed in this research design.

First, the bone materials will be lightly cleaned by brush to remove detritus that may obscure potentially diagnostic characteristics that may aid in the determination of genus or species. After cleaning, all bone elements will be examined and recorded by laboratory personnel. More specifically, attributes that will be recorded for each element include the most specific taxon possible, the element present, the side of the element, the portion of the element present, its apparent age, evidence of cultural and natural impacts to the element, and any additional comments deemed necessary.

Ancillary Studies

Various samples of artifacts, soils, and organics, will be sent to outside labs for analysis. Samples of charred wood will be sent to Beta Analytical for ^{14}C dating. Soil samples will be sent to Paleo Research Institute for pollen identification and counts and macrofossils. A selection of stone tools will also be sent to Paleo Research Institute for protein residue analysis. If needed, pollen washes from groundstone will also be sent there.

ANALYSIS

Descriptive Analysis of Artifact Classes

Data collected from each artifact sub-assemblage (lithics, ceramics, faunal materials, etc.) will be subjected to a descriptive statistical analysis to define its basic parameters. The descriptive analysis will consist of determining counts and percentages of various artifact types, among type variability, and general descriptions. Of course, each class of artifacts has unique characteristics that require additional analysis. The results of the descriptive analysis will be examined in regards to the hypotheses proposed in this research design, as well as any other patterning evident.

Historic Artifact Analysis

In order to address the specific research questions, it is necessary to collect qualitative and quantitative data on the artifacts comprising the trash dumps and to organize this data by means of a method that allows a standardized procedure for both characterizing and establishing a context of association with a period, property and event.

There are three basic kinds of data that can be derived from an analysis of historic artifacts. They are:

1. Maker marks and trademarks
2. The technology of the artifact
3. Aspects of local and national history

Williams and Higgs (1998, Appendix 2) have conveniently summarized the information that historic artifacts provide:

> **Maker marks** inform us about an artifact's manufacturer, while **trademarks** usually describe the contents of a container or the technology of manufacture. Both types of marks provide information on function, and date and city of manufacture. While some companies registered formal trade marks, others served as internal identifications (production plant codes, dates of manufacture, or unique company marks) or as advertising. The **technology of the artifact** can also provide clues about date and place of manufacture. Artifacts often reflect **local and national history** and governmental regulations, including local place or store names, events affecting industry, or laws regulating use or labeling.

By classifying the artifacts that comprise a historic trash dump or scatter in a standardized manner, basic information about date and place of manufacture is obtained, facilitating further analysis. Furthermore, a means of establishing association with a parent structure is obtained based on any temporal, functional and also spatial affiliation. In this instance, the scatters are characterized by functional and temporal diversity, and a spatial proximity to the town site. Therefore, it is most likely that they represent community-level discard expected for a landfill or dump site.

According to Sprague (1980: 252), "function is the highest and most productive basis for site analysis." With this in mind, Sprague (1980) developed an artifact typology that has been widely employed in the artifact classification of western U.S. historic sites. Within this typology, artifacts are assigned to one of eight major classes of items: Personal Items; Domestic Items; Architectural Items; Transportation-related Items; Commerce and Industry-related Items; Group Services; Group Ritual Items; and Unknown/Unclassified.

Once the individual artifacts have been ascribed a functional and/or temporal affiliation, the data is then analyzed to determine how the assemblage of items relate to one another, that is, moving from an individual artifact typology to an assemblage characterization. As Gould (1998) states: "Since the Sprague scheme is originally centered upon a notion of a single artifact's functional attributes, it does make sense that when considered at the assemblage level, aggregated activities are identified."

The premise here is that similarities and differences in behavior, spatial configuration and/or temporal affinity results in corresponding similarities or difference in the frequencies of classified items. Therefore, one is essentially linking particular configurations of artifacts with particular aspects of behavior that are, in turn, determined by particular cultural or social influences.

REPORTING RESULTS AND DISSEMINATION

A draft report detailing the project, the analyses, and conclusions will be submitted to Utah Divison of Oil, Gas, and Mining (DOGM) for review. Upon receiving review and comments from DOGM, a final report will be prepared incorporating any changes. A final document will be produced and submitted to DOGM and the State Historic Preservation Office.

CURATION

All archival and cultural materials collected or produced during the project's data recovery program will be submitted to the Utah Museum of Natural History, University of Utah, Salt Lake City, Utah.

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1987 Green Spring: An Anasazi and Southern Paiute Encampment in the St. George Basin of Utah. *Bureau of Land Management-Utah Cultural Resource Series Number* 21.

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APPENDIX A:
Curriculum Vitae for Key Personnel

NAME: Keith R. Montgomery

ADDRESS: P.O. Box 219
Moab, Utah 84532
(435) 259-5764
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EDUCATION: 1974 A.A. Edmonds Community College
1976 B.A. Western Washington University (Anthropology)
1979 M.A. Western Washington University (Archaeology/Anthropology)

PROFESSIONAL ORGANIZATIONS: Utah Professional Archaeological Council
Society for American Archaeology

PROFESSIONAL EXPERIENCE:

1996 - Present Principal Investigator, Montgomery Archaeological Consultants, Moab, Utah.
In charge of writing technical proposals, and initiating and directing all cultural resource projects. Responsible for ensuring that all projects conducted by the company meet required standards for compliance with federal and state legislature pertaining to cultural resources. To date, he has directed over 500 projects to completion on state, federal, and private lands.

1983-1996 Consulting Project Archaeologist, Sagebrush Archaeological Consultants, Ogden, Utah. Permitted under Sagebrush to conduct cultural resource investigations (survey, testing, and excavation) on federal and state lands in the Great Basin (Utah and Nevada) and Colorado Plateau (Utah, Colorado, and Arizona). Responsible for project planning and coordination, supervision of field crews, site recordation, NRHP assessments, data analysis, and report preparation.

1984-1996 Consulting Project Archaeologist, Abajo Archaeology, Bluff, Utah.
Permitted under Abajo to perform cultural resource investigations (survey, testing, excavation) on federal and state lands in the Utah, western Colorado, and northern Arizona). Responsible for project planning and coordination, technical proposals, supervision of field crews, site recordation and NRHP assessments, data analysis, and report preparation.

1981-1983 Staff Archaeologist. Archeological Environmental Research.
Corporation (AERC) Bountiful, Utah. Permitted (federal and state) to supervise cultural resource investigations (survey and excavation) in the Great Basin and Colorado Plateau (Fremont and Anasazi) geographical/cultural areas.

Selected Projects with Technical Reports and Publications:

Montgomery, K.
2005 Cultural Resource Inventory of EOG Resources, Inc.'s Five Proposed Wells: CWU #662-6, CWU #663-6, and East Chapita #1-5, #2-5, and #5-5 in Uintah County, Utah

Montgomery, K.
2004 Cultural Resource Inventory of Bill Barrett Corporation's Proposed Tumbleweed Units #14-17-15-21, #16-17-15-21, #9-18-15-21 and #1-19-15-21 Well Locations, Uintah County, Utah.

Montgomery, K.R., and D.L. Shank
2004 Cultural Resource Inventory for Utah Department of Transportation's SR 56 Bridge (Structure OC -307) Rehabilitation Project, East of Modena, Iron County, Utah.

Montgomery, K., and S. Kinnear-Ferris
2004 Cultural Resource Survey of Bill Barrett Corporation's Cedar Camp3D Seismic Project, Uintah and Grand Counties, Utah.

Elkins, M., and K. Montgomery
2004 Cultural Resource Block Inventory of Ute Tribal Lands in Sections 19, 30, and 31 of T5S R5W for UTE FNR LLC, Duchesne County, Utah.

Mrstik, J., and K. Montgomery
2004 Cultural Resource Inventory of Division of Wildlife Resources Consumers Road Parcels, Carbon County, Utah.

Whitefield, A., and K. Montgomery
2004 Cultural and Fossil Resource Inventory Along US Highway 89 and State Route 14 Near Long Valley Junction, Kane County, Utah. STP-0089(86)104.

Elkins, M. and K.R. Montgomery
2003 Cultural Resource Inventory For the Utah Department of Transportation's US 6 Helper Interchange, Carbon County, Utah. Report No. U-03-MQ-0320s.

2003 Class 1 Existing Data Review of Encana Oil and Gas Corporation's Proposed Oil and Gas Development Area in the Kennedy Wash Region of Uintah County, Utah. Report No. U-03-MQ-752b,s,p.

Montgomery, J.A. and K.R. Montgomery
2003 Utah Department of Transportation's State Route 10 Muddy Creek Bridge Replacement Cultural Resource Inventory, Emery County, Utah.

Elkins, M. and K.R. Montgomery
2002 Cultural Resource Inventory of UP&L Pacificorp Camp Williams To Four Corners 345kv Power Line, San Juan County, Utah.

Elkins, M. and K.R. Montgomery
2002 Cultural Resource Inventory of Seven Seismic Lines for the Veritas Uintah Seismic Project, Uintah County, Utah.

2002 Cultural Resource Inventory of the Emery Telecom's Fiber Optic Line Between the Towns of Price and Helper, Carbon County, Utah.

Kinnear-Ferris, S. and K.R. Montgomery
2002 Cultural Resource and Fossil Inventory of Utah Department of Transportation's SR-95 Westwater Canyon Realignment, San Juan County, Utah.

Montgomery, J. and K.R. Montgomery
2002 Utah Department of Transportation's State Route 10 Muddy Creek Bridge Replacement Cultural Resource Inventory, Emery County, Utah.

Montgomery, K.R. and S. Ball
2002 Cultural Resource Inventory of Inland Resources' 760-Acre Parcel in Township 8S, Range 16E, Section 24 and Township 8S, Range 17E, Section 19, Duchesne County, Utah.

Raney, A. and K.R. Montgomery
2002 Cultural Resource Inventory of the Dixie Escalante 138kV Power Line Project, Washington County, Utah.

Montgomery, K.R.
2001 Cultural Resource Inventories of 400 Acres in the Wells Draw and Pariette Bench Localities for Inland Production Company, Duchesne County, Utah. Montgomery Archaeological Consultants.

2001 Cultural Resource Inventories of 20 Well Locations, Access and Pipeline Routes in the Wonsits Valley Oil and Gas Field, Uintah County, Utah. For Shenandoah Energy, Inc. Montgomery Archaeological Consultants.

Montgomery, K.R. and S. Ball
2001 Cultural Resource Inventory of the Moore Road (County Road 1612) Emery County, Utah. Preapred for the Utah Department of Transporation under contract with JBR Environmental Consultants. Montgomery Archaeological Consultants.

2001 Cultural Resource Inventory of the Garkane Powerline Between Mount Carmel Junction and Zion National Park, Kane County, Utah. Montgomery Archaeological Consultants.

Montgomery, J.A. and K.R. Montgomery
2001 Cultural Resource Inventory of Bonnevilee Fuels Corporation's Willow Creek Pipeline, Uintah County, Utah. Montgomery Archaeological Consultants.

Elkins, M. and K.R. Montgomery
2001 Cultural Resource Inventory of Citizen Communications' Fiber Optic Line Along SR 174, Millard County, Utah. Montgomery Archaeological Consultants.

Elkins, M. and K.R. Montgomery
2001 Cultural Resource Inventory for the Utah Department of Transportation's US 89 Intersection Improvement Near Big Water, Kane County, Utah. Montgomery Archaeological Consultants.

Patterson, J.J. and K.R. Montgomery
2001 Cultural Resource Inventory of the Quitchupah Coal Haul Road, Emery and Sevier Counties, Utah. Montgomery Archaeological Consultants.

Montgomery, K.R.
2000 Archaeological Data Recovery at a Prehistoric Quarry (Site 5RB790/42Un1669) In Hells Hole Canyon, Rio blanco County, Colorado. Montgomery Archaeological Consultants.

Montgomery, K.R. and S. Ball
2000 Cultural Resource Inventory of Marathon Oil Company's 2000 Drilling Program in Castle Valley, Carbon County, Utah. Montgomery Archaeological Consultants.

Montgomery, K.R. and J.A. Montgomery
2000 Utah Department of Transportation's Interstate 70 to Price State Route 10 Passing Lanes Cultural Resource Inventory, Emery and Carbon Counties, Utah. Montgomery Archaeological Consultants.

2000 Cultural Resource Inventory and Evaluative Testing of Utah Department of Transportation's U.S. 191 White Mesa Amended Right-of-Way Access Project, San Juan County, Utah. Montgomery Archaeological Consultants.

Montgomery, K.R.
1999 Cultural Resource Inventory of the Plateau's Willow Creek Mine Pipeline Gathering System, Carbon County, Utah. Montgomery Archaeological Consultants.

1999 Cultural Resource Inventory of Coastal Oil and Gas Corporation's Ten Well Locations in the Park Mountain Area, Rio Blanco County, Colorado. Montgomery Archaeological Consultants.

Montgomery, K.R. and J.A. Montgomery
1999 Cultural Resource Inventory Along Salina's Main and State Streets, Sevier County, Utah. Montgomery Archaeological Consultants.

Montgomery, K.R., J.A. Montgomery, and S.Kinnear-Ferris
1999 Cultural Resource Inventory of the Emery Telephone Fiber Optic Line Ferron to Emery, Emery County, Utah. Montgomery Archaeological Consultants.

Montgomery, J.A., and K.R. Montgomery
1999 Eligibility Testing at Site 42Cb1302, Carbon County, Utah. Montgomery Archaeological Consultants.

Montgomery, K.R.
1998 Cultural Resource Inventories of Coastal Oil and Gas Corporation's Douglas Creek Unit Wells #67, #69, and #70, Rio Blanco, Colorado. Montgomery Archaeological Consultants.

Montgomery, K.R.
1998 Data Recovery at Site 42Em2423.1 for the Proposed Cottonwood Creek Water Treatment Plant in Emery County, Utah. Montgomery Archaeological Consultants.

Montgomery, K.R., and J.A. Montgomery
1998 Cultural Resource Inventory of the Bryce Canyon Foster's Development Parcel, Garfield County, Utah. Montgomery Archaeological Consultants.

1998 Cultural Resource Investigations of the Joe Wilson Canyon Pipeline, San Juan County, Utah. Montgomery Archaeological Consultants.

1998 Cultural Resource Inventory of the Goblin Valley Materials Pit, Emery County, Utah. Montgomery Archaeological Consultants.

Montgomery, J.A.., and K.R. Montgomery
1998 Cultural Resource Inventory of the Jack Spring Water Line Project, San Juan County, Utah. Montgomery Archaeological Consultants.

1998 Cultural Resource Inventory of the Wellington Canal Irrigation and Water Conservation Project, Carbon County, Utah. Montgomery Archaeological Consultants.

Montgomery, K.R., and J.A. Montgomery
1997 Cultural Resource Inventory and Site Testing of the Cottonwood Creek Water Project, Emery County, Utah. Montgomery Archaeological Consultants.

Montgomery, K.R., and J.A. Montgomery
1997 Cultural Resource Inventory and Evaluative testing for the Wilson Arch Power Line Project, San Juan County, Utah. Montgomery Archaeological Consultants.

1997 Cultural Resource Inventory of the Emery Telephone Company's Green River to Crescent Junction Fiber Optic Line, Grand County, Utah. Montgomery Archaeological Consultants.

1997 Cultural Resource Inventory of the Moab Airport to Crescent Junction Fiber Optic Line, Grand County, Utah. Montgomery Archaeological Consultants.

Montgomery, K.R., and J.A. Montgomery
1996 Cultural and Paleontological Resource Inventory of Utah Department of Transportation's U.S. 191 Lane Addition and Drainage Easement for the Kane Springs Wash Bridge Replacement Project, San Juan County, Utah. Abajo Archaeology.

1996 Cultural Resource Inventory and Evaluation of Utah Department of Transportation's Mormon Tank Wash Bridge Replacement Project Along U.S. 191, San Juan County, Utah. Abajo Archaeology.

Montgomery, K.R.
1996 Evaluative Testing of Site 42Gr2556 along Tusher Canyon Road (CR126), Grand County, Utah. Abajo Archaeology.

W.E. Davis and K.R. Montgomery.
1996 Site 42Sa22396: A Prehistoric Hoe Procurement Site on Big Bench, Southern San Juan County, Utah. Utah Archaeology 1996.

Montgomery, K.R., and J.A. Montgomery
1995 Cultural Resource Inventory of Pacificorp/Utah Power's Proposed 345 kV Transmission Line Green River to Grand Junction Section, Grand County, Utah and Mesa County, Colorado. Volumes I and II. Abajo Archaeology.

Montgomery, K.R.
1995 Cultural Resource Inventory and Evaluative Testing for Utah Department of Transportation's State Route 18: St. George to Snow Canyon, Washington County, Utah. Abajo Archaeology.

Montgomery, K.R., and J.A. Montgomery
1994 Cultural Resource Inventory and Evaluation of Utah Department of Transportation's Mormon Tank Wash Bridge Replacement Project along U.S. 191, San Juan County, Utah. Abajo Archaeology.

1994 Cultural Resource Inventory and Historical Reconnaissance Survey for Utah Department of Transportation's SR-260, Sevier County, Utah. Abajo Archaeology.

Montgomery, K.R.
1994 Cultural Resource Inventory of Utah Departments of Transportation's La Sal Junction road improvement project along U.S. 191 and SR-46, San Juan Co., Utah. Abajo Archaeology.

Montgomery, K.R., and J.A. Montgomery
1993 Utah Department of Transportation's State Route 31 Huntington Canyon Project: Archaeological Excavations at Site 42Em2109 and 42Em2095, Emery County, Utah. Abajo Archaeology.

Montgomery, K.R.
1993 Cultural Resource Inventory and Site Testing for White Mesa Sanitary Landfill in San Juan County, Utah. Abajo Archaeology.

Montgomery, K.R., and J.A. Montgomery
1992 Cultural Resource Inventory and Evaluation of the Utah Department of Transportation's State Route 14 Corridor between Mileposts 0.6 and 8.5, Iron County, Utah. Abajo Archaeology.

Montgomery, K.R., and J.A. Montgomery
1992 Cultural Resource Inventory and Evaluation of Garfield County's Johns Valley Road Improvement Project, State Road 22 Survey Corridor between Mileposts 12.00 and 16.58, Garfield County, Utah. Abajo Archaeology.

Montgomery, K.R.
1992 Cultural Resource Inventories of Utah Department of Transportation's Circleville to Junction State Route 89 and State Route 62 Project Areas, Piute County, Utah. Abajo Archaeology.

Montgomery, K.R.
1990 Cultural Resource Survey of a Gold Mine Near Soup Rock, San Juan County, Utah. Sagebrush Archaeological Consultants.

1989 Cultural Resource Inventory of the Proposed Utah Department of Transportation`s Dubinkey Road Materials Pit, Grand County, Utah. Abajo Archaeology.

Montgomery, K.R.
1989 Cultural Resource Inventories and Evaluations of the Utah Department of Transportation`s Information/View Localities along State Route 313, Grand County, Utah. Abajo Archaeology.

1988 Cultural Resource Inventory of the Proposed Utah Department of Transportation's Sagebrush Bench Materials Pit, Emery County, Utah. Abajo Archaeology.

Montgomery, K.R., and J.A. Montgomery
1988 The Archaeology of the Recapture Dam Pipeline Project, Phase I, San Juan County, Utah. Abajo Archaeology.

1988 Archaeological Testing for Utah Department of Transportation at Site 42Em1876: Interstate Highway 70, Castle Valley to Beyond Muddy Creek Segment, Emery County, Utah. Abajo Archaeology.

1988 Archaeological Testing at Sites 42Sa10636, 42Sa18241 and 42Sa20040 Along U.S. Highway 191, Grand and San Juan Counties, Utah. Abajo Archaeology.

Montgomery, K.R.
1987 Cultural Resource Inventory of the Utah Department of Transportation's Ferron Creek Bridge and Highway Improvement Project in Emery County, Utah. Abajo Archaeology.

Montgomery, K.R., and J.A. Montgomery
1987 Cultural Resource Inventory of the State of Utah's Horse Pasture No. 2 Chaining Program, Grand County, Utah. Abajo Archaeology.

Montgomery, K.R.
1986 Intensive Cultural Resource Inventory of the Proposed Utah Department of Transportation Cat Canyon Materials Pit, Carbon County, Utah. Abajo Archaeology.

Montgomery, K.R., and J.A. Montgomery
1986 Cultural Resource Inventory and Avoidance Recommendations for the Alkali Road Improvement Project, San Juan County, Utah. Abajo Archaeology.

Montgomery, K.R., and J.A. Montgomery
1985 Cultural Resource Inventory and Avoidance on Seven Seismographic Transects for Champlin Petroleum, Alkali Prospect, San Juan County, Utah. Abajo Archaeology.

Montgomery, K.R.
1983 Cultural Resource Survey of Five Seismic Lines in San Juan County, Utah. Environment Consultants Inc., Dallas, Texas.

Montgomery, J.A., K.R. Montgomery, D.Weder, and F.R. Hauck
1982 Archaeological Investigations in the Ten Mile Potash Project Area in Grand County, Utah. AERC Paper No. 35, Archaeological Environmental Research Corporation, Salt Lake City.

Montgomery, K.R.
1981 Archaeological Reconnaissance of Seismic Corridors and Access Roads in the Cottonwood Canyon, Tank Mesa, Montezuma Canyon, Cedar Peak, and Little Ruin Canyon Localities of San Juan County, Utah. Archeological Environmental Research Corporation.

Montgomery, K.R.
1979 Prehistoric Settlements of Sumas Valley, Washington. Masters's Thesis, Department of Anthropology, Western Washington University.

Montgomery, K.R.
1978 "A Preliminary Report of Archaeological Research of the Sumas Area." Paper Presented to the 31st Annual Northwest Anthropological Conference.

Patricia M. Stavish
Curriculum Vitae 2007

EDUCATION:

2003-2005 Masters of Science in Anthropology with a focus in Archaeology, Dec. 2005
University of Wisconsin-Milwaukee, Milwaukee, WI. Thesis: Women and Children First: The Distribution of Grave Goods at the La Tene cemetery Munsingen-Rain.

1998-2002 Bachelor of Arts Degree with a major in Anthropology.
University of Minnesota-Twin Cities, Minneapolis, MN.

PROFESSIONAL ORGANIZATIONS:

Archaeological Institute of America (AIA)

PROFESSIONAL EXPERIENCE:

April-Sept 2005
Feb 2006 to Present Staff Archaeologist, Montgomery Archaeological Consultants, Moab, Utah. Responsibilities include fieldwork (survey and mitigation); documentation of cultural resources; site eligibility assessments; laboratory analysis of artifacts technical and research design reports. Skilled in a number of software packages including Microsoft Word, Excel, GPS Pathfinder and ArcView; and is proficient with the use of GPS units and related software (e.g. Trimble GeoExplorer II and III).

2004 Archaeological Crew Member, Bad Duerrnberg, Hallein, Austria. Excavation of Iron Age settlement. Tasks included retrieval of artifacts and identification of settlement features; use of total station and theodolite to record artifacts and; laboratory analysis.

2002-2004 Archaeological Field Technician: Foth and Van Dyke, Eagan, MN. Phase I, II and III archaeological survey and excavation in Minnesota and Iowa. Operation of archaeological and survey equipment.

2000 Archaeological Assistant. Minnesota Historical Society, St. Paul, MN. Excavation of the Mill City ruins (historical urban site). Collection and documentation of archaeological data; creation of scaled drawings of historic structures; operation of survey and GPS equipment.

2000 University of Minnesota-Twin Cities Field School. Excavation of historical fur trading site in Mendota Minnesota. Skills acquired: survey methods, site mapping, excavation of test units, mapping unit floors, profiles and features.

Utah Fieldwork (Montgomery Archaeological Consultants)

2005 Archaeological Technician. Cultural Resource Inventory of Alton Coal Development, Kane County, Utah (2 months). Cultural Area: Anasazi

2005 Archaeological Technician. HDR Engineers Central Railroad Project, Sevier County, Utah (2 weeks). Cultural Area: Great Basin

2005 Archaeological Technician. Utah Department of Transportation's Data Recovery at Sites 42Sa25619, 42Sa25664, and 42Sa25664, San Juan County, Utah (1 month). Cultural Area: Anasazi

2005 Archaeological Technician. Cultural Resource Inventory of Bill Barrett Corporation's Seismic Project Near Pine Ridge, San Juan County, Utah. (1.5 months). Cultural Area: Anasazi

2005 Archaeological Technician. Cultural Resource Inventory for the Santa Clara River Bridge on Shivwits Tribal Land, Washington County, Utah (2 weeks). Cultural Area: Anasazi

2005 Archaeological Technician. Cultural Resource Inventory of 13 EOG Resources well locations, Uintah County, Utah (1 week). Cultural Area: Great Basin

2005 Archaeological Technician. Cultural Resource Inventory of 5 EOG Resources well locations, Uintah County, Utah (3 days). Cultural Area: Great Basin

2005 Archaeological Technician. Cultural Resource Inventory of Veritas Geophysical Integrity's Seep Ridge 3D seismic prospect, Uintah County, Utah (3 weeks). Cultural Area: Great Basin.

2006 Archaeological Technician. Cultural Resource Inventory of Consol Coal's Hidden Valley development parcels, Emery County, Utah (1 week). Cultural Area: Great Basin

2006 Archaeological Technician. Cultural Resource Inventory of Delta Petroleum's three well locations, Grand County, Utah (1 week). Cultural Area: Great Basin

2006 Archaeological Technician. Cultural Resource Inventory of Tidewater's four well locations, Grand County, Utah (1 week). Cultural Area: Great Basin

2006 Archaeological Technician. Cultural Resource Inventory of the Adam's mineral claims, Grand County, Utah (2 weeks). Cultural Area: Great Basin

2006 Archaeological Technician. Cultural Resource Inventory of Kerr-McKee's Ouray compressor to Bridge station pipeline, Uintah County, Utah (5 days). Cultural Area: Great Basin.

2006 Archaeological Technician. Cultural Resource Inventory of Kerr-McKee's proposed State 921-33M well location, Uintah County, Utah (4 days). Cultural Area: Great Basin.

2006 Archaeological Technician. Cultural Resource Inventory of Kerr-McKee's proposed State 921-33M well location, Uintah County, Utah (4 days). Cultural Area: Great Basin.

2006 Archaeological Technician. Cultural Resource Inventory of Kerr-McKee's proposed State 1021-36L well location, Uintah County, Utah (4 days). Cultural Area: Great Basin.

Utah Fieldwork (Montgomery Archaeological Consultants)

2006 Archaeological Technician. Cultural Resource Inventory of EOG Resources well Locations North Duck Creek 320-27, 321-27, 322-27, 323-27, 324-27, 318-33, 319-33 on Ute Tribal Lands, Uintah County, Utah (1 week). Cultural Area: Great Basin

2006 Archaeological Technician. Cultural Resource Inventory of Kerr-McKee NBU 1021-10P well location, Uintah County, Utah (5 days). Cultural Area: Great Basin

2006 Archaeological Technician. Cultural Resource Inventory of Kerr-McKee NBU 1021-7B well location, Uintah County, Utah (5 days). Cultural Area: Great Basin

2006 Archaeological Technician. Cultural Resource Inventory of Enduring Resources'10 Southam Canyon well locations, Uintah Co., Utah (1 week). Cultural Area: Great Basin

2006 Archaeological Technician. Cultural Resource Inventory of Questar E & P 13 well locations in the Wonsits Valley on Ute Tribal Lands, Uintah Co. Utah (1 week). Cultural Area: Great Basin.

2006 Archaeological Technician. Cultural and Fossil Inventory of Utah Department of Transportation's Hurricane State Route 9 / 600 North Project NH-0009(11)10E, Washington Co., Utah (2 weeks). Cultural Area: Anasazi

2006 Archaeological Technician. Additional Cultural Resource Inventory for the Southern Corridor Project, Phase I, Interstate 15 to River Road. Addendum to: Cultural and Fossil Inventory of Utah Department of Transportation's Southern Corridor Project, Washington Co., Utah (1 week). Cultural Area: Anasazi

2006 Archaeological Technician. Cultural and Fossil Resource Inventory for Utah Department of Transportation's US-89 Kanab to Kanab Creek Bridge Project, Kane Co., Utah (4 weeks). Cultural Area: Anasazi

2006 Archaeological Technician. Cultural and Fossil Resource Inventory for Utah Department of Transportation's SR-11 Ranchos Road to Landfill Road Project, Kane Co., Utah (2 days). Cultural Area: Anasazi

2007 Archaeological Technician. Data Recovery and Monitoring for Sites 42Sa20727, 42Sa21484, 42Sa21485, 42Sa24113, and 42Sa24114, San Juan Co, Utah. Utah Department of Transportation's US 191 Blanding to Moab Passing Lanes Improvement Project. (5 weeks). Cultural Area: Anasazi

LABORATORY WORK

2004 Lab Volunteer. Old World section in the Archaeology laboratory at the University of Wisconsin-Milwaukee. Digitizing field drawing from excavations in Germany.

2002-2003
Archaeological Lab Technician. Forth and Van Dyke, Eagan MN. Washed and cataloged artifacts, including both prehistoric and historical remains from surveys and excavations.

TEACHING EXPERIENCE

Fall 2005 Teaching Assistant. Introduction of Anthropological Statistics, University of Wisconsin-Milwaukee.

Spring 2005 Teaching Assistant. Introduction of Cultural Anthropology, University of Wisconsin-Milwaukee.

Fall 2004 Teaching Assistant. Introduction of Anthropological Statistics, University of Wisconsin-Milwaukee.

RESEARCH EXPERIENCE

2004 Part of a graduate student team involved in digitizing excavation drawings from the UWM "Landscape of Ancestors" project in Germany (http://www.uwm.ed/~barnold/arch/). Mortuary contexts, including burials, from two early Iron Age mounds digitized using Canvas software.

2002 Research assistant to Professor Greg Laden, Dept. Of Anthropology; University of Minnesota-Twin Cities, Minneapolis, MN. Library research on various topics of Biological Anthropology and Archaeology.

2001-2002
Research Assistant to Professor Robert Blanchette, Department of Plant Pathology; University of Minnesota-Twin Cities, Minneapolis, MN. Identification of archaeological wood samples using light microscope and digital imaging equipment.

PRESENTATIONS

December
2005 American Anthropological Association: 104th Annual Meeting, Washington, DC. Session: Materialization of Social Identity. Presentation of paper "Women and Children First: An Analysis of Grave Goods and Gender in the Iron Age Cemetery at Munsingen-Rain."

November
2004 Chacmool Gender Conference: Qu(e)erring Archaeology, Calgary, Alberta, Canada
Session: Expressions of Gender Identity in Mortuary Context. Presentation of paper "Women and Children First: The Distribution of Grave Goods at the La Tene cemetery Munsingen-Rain."

TECHNICAL PUBLICATIONS (Montgomery Archaeological Consultants)

Stavish, P. and K. Montgomery

2005 Cultural Resource Inventory of EOG Resources' Proposed 3 CWU Wells: #684-1, #677-6, and #680-6 in Uintah County, Utah. Project No. U-05-MQ-0783b.

Cultural Resource Inventory of EOG Resources' Proposed 4 CWU Wells: #1039-18, #1034-19, #1035-19 and #692-20 in Uintah County, Utah. Project No. U-05-MQ-0780b.

Cultural Resource Inventory of EOG Resources' Proposed 5 Chapita Wells Units in Sections 29 and 30 of Township 9 South, Range 23 East in Uintah County, Utah. Project No. U-05-MQ-0781b.

Cultural Resource Inventory of EOG Resources' Proposed 4 CWU Wells: #1039-18, #1034-19, #1035-19 and #692-20 in Uintah County, Utah. Project No. U-05-MQ-0780b.

Cultural Resource Inventory of EOG Resources' Proposed 2 East Chapita Wells Units in Section 5 of Township 9 South, Range 23 East in Uintah County, Utah. Project No. U-05-MQ-0779b.

Cultural Resource Inventory of EOG Resources, Inc.'s Proposed Chapita Wells Unit #1065-3 (Previous #597-3), #1066-3 (Previous #543-3), and #1067-3 (Previous #542-3) in Uintah County, Utah. Project No. U-05-MQ-0778b.

Cultural Resource Inventory of EOG Resources, Inc.'s Proposed Chapita Wells Unit #1041-22 (Previous #237-22) and #1042-28 (Previous #401-28F) in Uintah County, Utah. Project No. U-05-MQ-0777b.

Cultural Resource Inventory of EOG Resources, Inc.'s Proposed Chapita Wells Unit #1036-13 (Previous #236-13), #1037-13 (Previous #338-13), and #1038-24 (Previous #328-24F) in Uintah County, Utah. Project No. U-05-MQ-0776b.

Cultural Resource Inventory of Westport Oil & Gas NBU #922-34 D, K, M and 0 Well Locations, Uintah County, Utah. Project No. U-05-MQ-0782b.

Cultural Resource Inventory of EOG Resources, Inc.'s 13 Proposed Well Locations: North Chapita #225-33, #284-6, #287-5, Stagecoach #97-8, #98-8, #99-8, #100-8, #106-8, #107-8, #108-8, CWU #982-9, #983-9, #985-9 in Uintah County, Utah. Project No. U-05-MQ-0795i.

Cultural Resource Monitoring of Westport Resources Pipeline Corridor, Carbon County, Utah. Montgomery Archaeological Consultants, Moab, Utah. BLM, Vernal Field Office. Permit No. U-05-MQ-041lb Part 2 of 2.

Cultural Resource Inventory of Portions of the Grey Wolf Parcel for the State of Utah, Division of Wildlife Resources, Duchesne County, Utah. Project No. U-05-MQ-0802s.

Cultural Resource Inventory of EOG Resources, Inc.'s Proposed Stagecoach Wells #109-7, #104-17, #80-20 and CWU #1016-16, Uintah County, Utah. Project No. U-05-MQ-0786i.

Stavish, P.
2006 Cultural Resource Inventory of Newfield Exploration's 40 Acre Parcel in Township 9S, Range 16E, Section 15, Duchesne, Utah. Project No. U-06-MQ-0349b,s.

Cultural Resource Inventory of Kerr-McGee Oil & Gas Onshore LP'S Proposed Ouray Compressor to Bridge Station Pipeline and Power Line in Uintah County, Utah. Project No. Project No. U-06-MQ-0348i.

Cultural Resource Inventory of Kerr-McGee Oil & Gas Onshore LP's Proposed State #921-33M Well Location, Uintah County, Utah. Project No. U-06-MQ-488s.

Cultural Resource Inventory of Kerr-McGee Oil & Gas Onshore LP's Proposed Well Locations State #1021-36L and #1021-36M Uintah County, Utah. Project No. Project No. U-06-MQ-0325b,s.

Cultural Resource Inventory of EOG Resources Inc.'s Proposed Well Locations North Duck Creek 320-27, 321-27, 322-27, 323-27, 324-27, 318-33, 319-33 on Ute Tribal Lands, Uintah County, Utah. Project No. U-06-MQ-0324i.

Cultural Resource Inventory of the Delta Petroleum Corporation Energy's Proposed Greentown Federal #33-12 and #35-12 Well Locations, Grand County, Utah. Project No. U-06-MQ-0288b.

Cultural Resource Inventory of Alton Coal Development's Sink Valley-Alton Amphitheater Project Area, Kane County, Utah. Project No. U-05-MQ-0346b,p.

Cultural and Fossil Inventory of Utah Department of Transportation's Hurricane State Route 9 / 600 North Project NH-0009(11)10E, Washington Co., Utah. Report No. U-06-MQ-1443b,p.

Additional Cultural Resource Inventory for the Southern Corridor Project, Phase I, Interstate 15 to River Road. Addendum to: Cultural and Fossil Inventory of Utah Department of Transportation's Southern Corridor Project, Washington Co., Utah. Report No. U-06-MQ-0946s.

Cultural and Fossil Resource Inventory for Utah Department of Transportation's US-89 Kanab to Kanab Creek Bridge Project, Kane Co., Utah. Report No. U-06-MQ-1700b,p,s.

Cultural and Fossil Resource Inventory for Utah Department of Transportation's SR-11 Ranchos Road to Landfill Road Project, Kane Co., Utah. Report No. U-06-MQ-1701p.

Stavish, P.
2007 Cultural Resource Inventory of Alton Coal Development's Project Area, Kane County, Utah. Report No. U-05-MQ-1568b,p.

APPENDIX B
Level and Artifact Recording Forms

MONTGOMERY ARCHAEOLOGICAL CONSULTANTS TESTING FORM

PROJECT: SITE:
EXCAVATORS: DATE:
TEST UNIT NUMBER: Screen mesh size:
Unit Size: Unit Orientation: Datum Corner:

Unit Description: _____
_____
_____
_____

General Surface Planview:

North

Is the depth below datum or MGS?
Level Number (Depth)/Description:_____
_____
_____
_____
_____
_____

Level Number (Depth)/Description:_____
_____
_____
_____
_____
_____

Lithic Analysis Form

Site:_____ AU#_____ Analyst:_____ Date: _____Page ___ of

Cat.	Grid	Sec	Layer	Level	Mat.	Color	% Cortex	Cortex Type	Platform	Cond.	HT	Use	mm of Use	# Dors. Scars	Tech. Type	tFunc. Type	Size Class

Ground Stone Analysis Form

Site:_____ AU#: _____ Analyst:_____ Date:_____
Page__ of __

Cat #	Prov.	Mat.	Color	Manufacture	# Use Surface	Size of surface	Attrition	X-section	Function	Size

Faunal Analysis Form

Site:_____ AU#: _____ Analyst:_____ Date:_____
Page__ of __

Cat #	Prov.	Taxon	Element	Side	Portion	Sex	Age	C-Forms	N-Forms	Comment